Experiment No.   7 _____

Title: CAPTCHA

Batch: B2   Roll No.: 16010420117   Experiment No.: 7

Aim: To implement a login web page and validate the credentials and login using valid CAPTCHA with image.

Resources needed: Windows/Linux.

Theory

What is CAPTCHA?

CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) is a type of security measure known as challenge-response authentication. CAPTCHA helps protect you from spam and password decryption by asking you to complete a simple test that proves you are human and not a computer trying to break into a password protected account.

A CAPTCHA test is made up of two simple parts: a randomly generated sequence of letters and/or numbers that appear as a distorted image, and a text box. To pass a test and prove your human identity, simply type the characters you see in the image into the text box.

Why does Website use CAPTCHA?

Company website is committed to keeping your information safe and secure. CAPTCHA offers protection from remote digital entry by making sure only a human being with the right password can access your account. CAPTCHA works because computers can create a distorted image and process a response, but they can't read or solve the problem the way a human must to pass the test.

Many web services, including Google, use CAPTCHA to help prevent unauthorized account entry. You may also see CAPTCHA on other sites that provide access to sensitive information, such as bank or credit card accounts.

When does Websites use CAPTCHA?

Websites uses CAPTCHA to strengthen the security around the most sensitive account access points. You may see a Google CAPTCHA when you:

- Sign up for a new Google service (Gmail, Blogger, YouTube)
- Sign up for any edition of a Google Workspace Account
- Change a password on an existing account
- Setup Google services for a third party device or application (such as iPhone , Outlook, ActiveSync, etc.)

 I am having difficulty viewing a CAPTCHA image. What can I do?

If you can't see a CAPTCHA image or are having trouble reading the text, refresh your browser for a new image.

Match the characters in the picture   Help

To continue, type the characters you see in the picture. Why?

The picture contains 8 characters.

Characters: [   ]

Continue

Although CAPTCHAs normally rely on images, audio versions are available for the visually impaired. To access an audio version, click the link that appears near the text box as the International Symbol of Access image (the wheel-chair icon). The alternate text for this image is, "Listen and then type the numbers you hear." CAPTCHA is not supported for the deaf-blind community.

Activity:
Design a web site login page for validation and verification using:
1. Image CAPTCHA
2. Use at least 10 Different images with combination of Upper case lower case digits and special character.
3. Use supporting database if required.

Implementation:
Implement the web site login page, Login credential must have encryption & decryption Feature for each credentials. Hash Function can be used for checking the integrity of credentials. Home page must be seen once all validation and verification is done using Encryption, Hashing & CAPTCHA.

Results: (Program with output as per the format)

login.php

```php
<!DOCTYPE html>
<html>
<body>
<?php
    $a=array("226md","22d5n","2356g","23mdg","243mm", "2bg48", "25epg",
"245y5", "268g2", "25257");
    $k = array_rand($a);
?>


    <h2>Captcha</h2>
    <form method="post" action="form.php">
        Username: <input type = "text" name = "uname"> <br> <br>
        Password: <input type = "password" name = "pwd"> <br> <br>
        <img src='<?php echo "./img/".$a[$k].".png"; ?>' height="30"
width="100"/> <br />
        Captcha: <input type="text" name="cap"> <br />
```

```html
        <input type="text" name="k" value="<?php echo $k; ?>" hidden>
<br />
        <br><br>
        <input type="submit" name="submit" value="Submit">
        <input type = "reset">
    </form>
</body>

</html>
```

form.php

```php
<?php
    $servername = "localhost";
    $username = "root";
    $password = "sohambhoir5102";
    $dbname = "117";
    $conn = new mysqli($servername, $username, $password, $dbname);
    if ($conn->connect_error) {
        die("Connection failed: " . $conn->connect_error);
    }

    $a=array("226md","22d5n","2356g","23mdg","243mm", "2bg48", "25epg",
"245y5", "268g2", "25257");
    if ($_POST['cap'] == $a[$_POST['k']]) {
        $sql = "select *from users where name = '$username' and pwd =
'$password'";
        $result = mysqli_query($db, $sql);
        $row = mysqli_fetch_array($result, MYSQLI_ASSOC);
        $count = mysqli_num_rows($result);

        if($count == 1){
            echo "<h1><center> Login successful </center></h1>";
        }
        else {
            echo "<h1> Login failed. Invalid username or
password.</h1>";
        }
    } else {
        echo "<h1>Wrong Captcha Error</h1>";
    }
?>
```
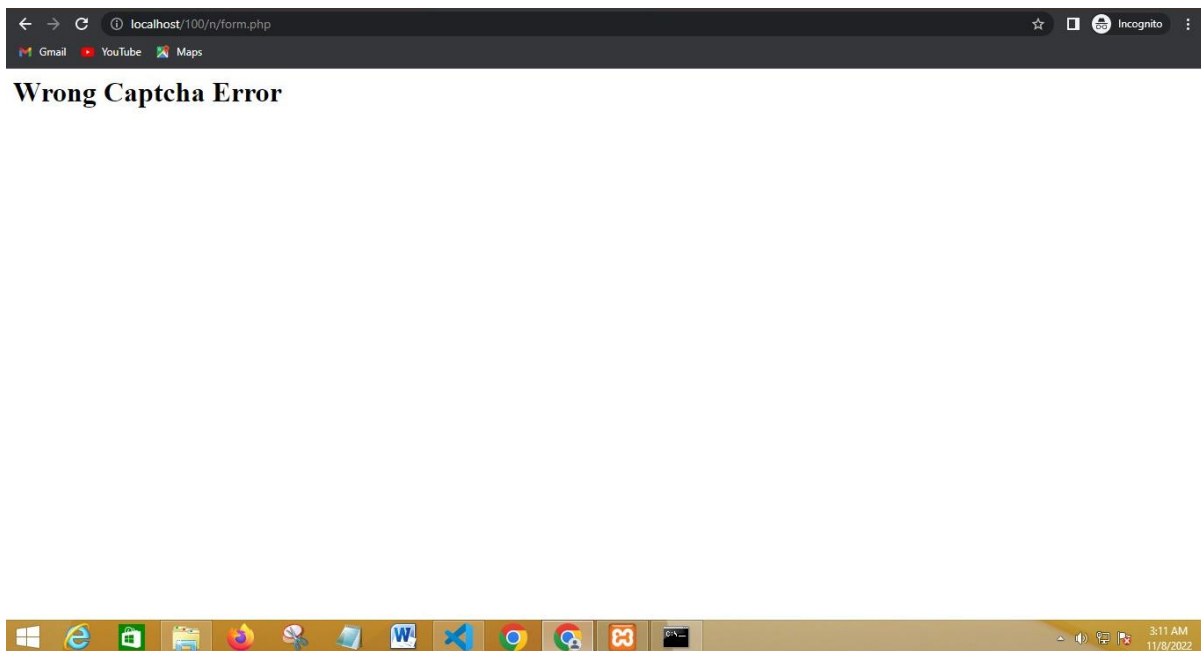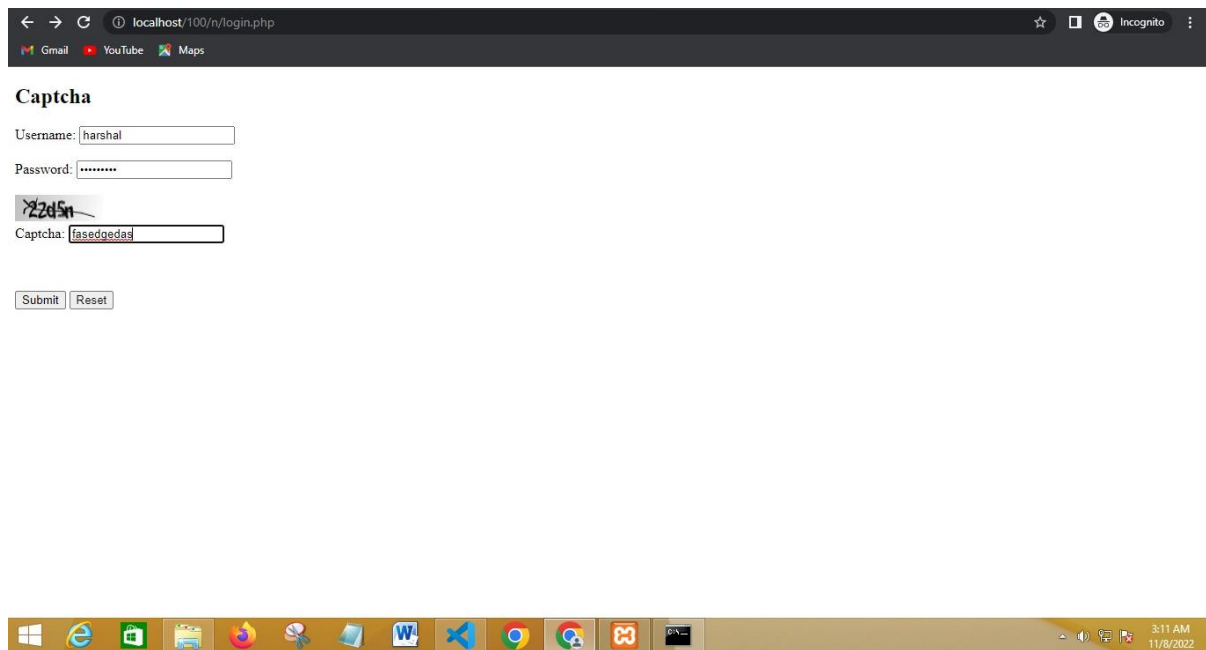
Captcha right & Login successful

Questions:
1) Describe Various technical methods that might be used to break the CAPTCHA.
Ans: Simple CAPTCHAs can be bypassed using the Optical Character Recognition (OCR) technology that recognizes the text inside images, such as scanned documents and photographs. Using computer vision, convolutional neural network, and python frameworks and libraries like Keras, tensorflow. We can train deep convolutional neuralnet models to find the letters and digits in the CAPTCHA image. There are some onlineCAPTCHA-solving services. The service has human workers who are available online constantly to solve CAPTCHAs. When you send your CAPTCHA solving request, the service forwards it to the solvers who break it and return the solutions.

Outcomes: CO 3: Describe various access control policies and models

Conclusion: Implementation a login web page and validate the credentials and login using valid CAPTCHA with image was successfully studied, understood and conducted.

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of faculty in-charge with date

References: Books/ Journals/ Websites:
1. Behrouz A. Forouzan, "Cryptography and Network Security", Tata McGraw Hill
2. William Stalling, "Cryptography and Network Security", Prentice Hall