BHARATIYA VIDYA BHAVAN'S
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DEPARTMENT OF COMPUTER ENGINEERING

SUBJECT: Cryptography and Network Security

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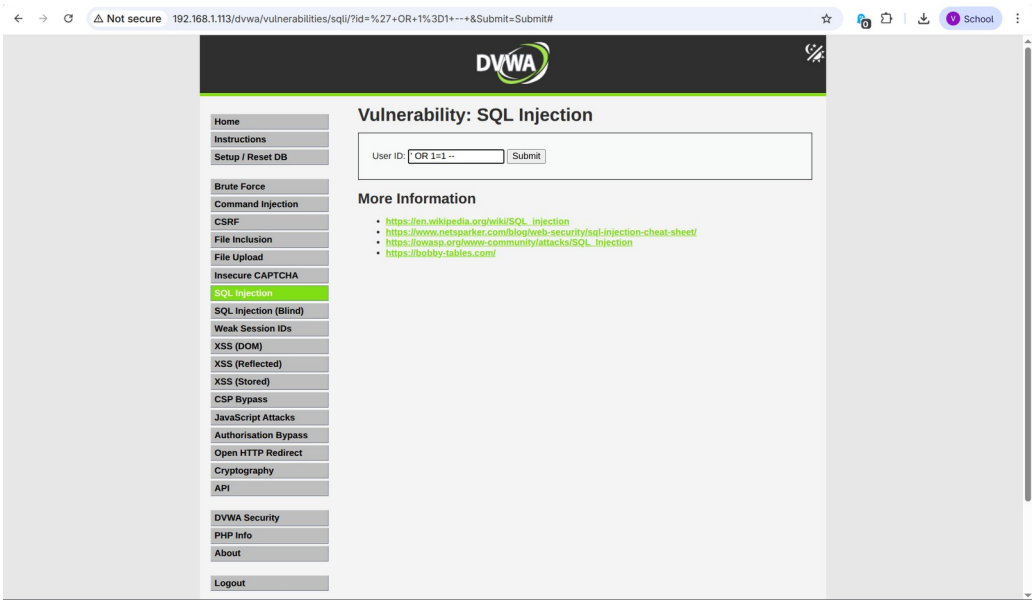
Experiment No.	**7**

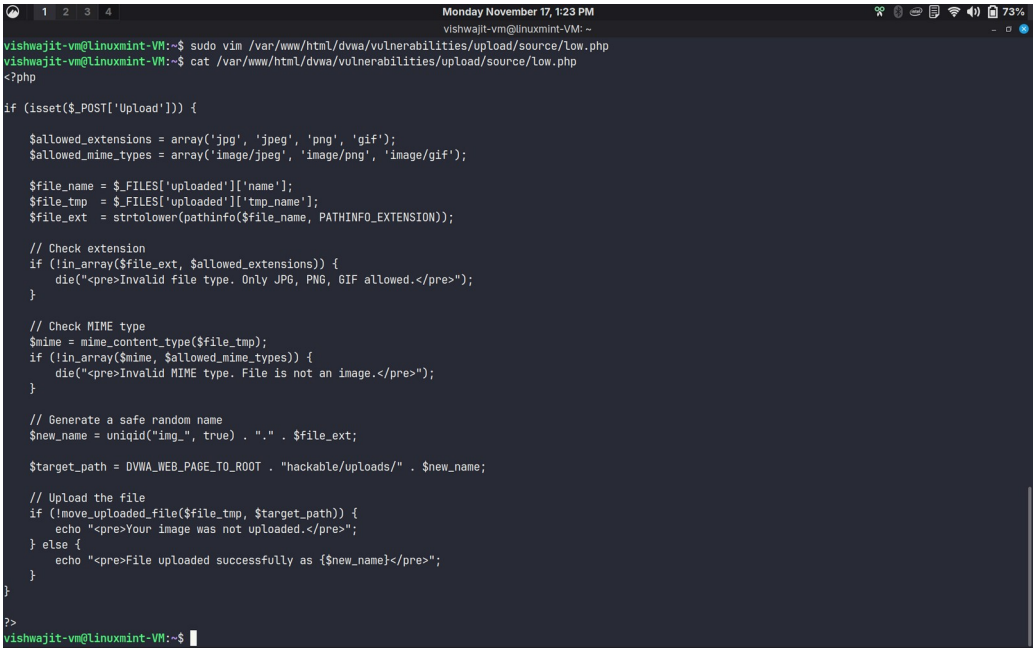
AIM:	To mitigate the vulnerabilities in DVWA.

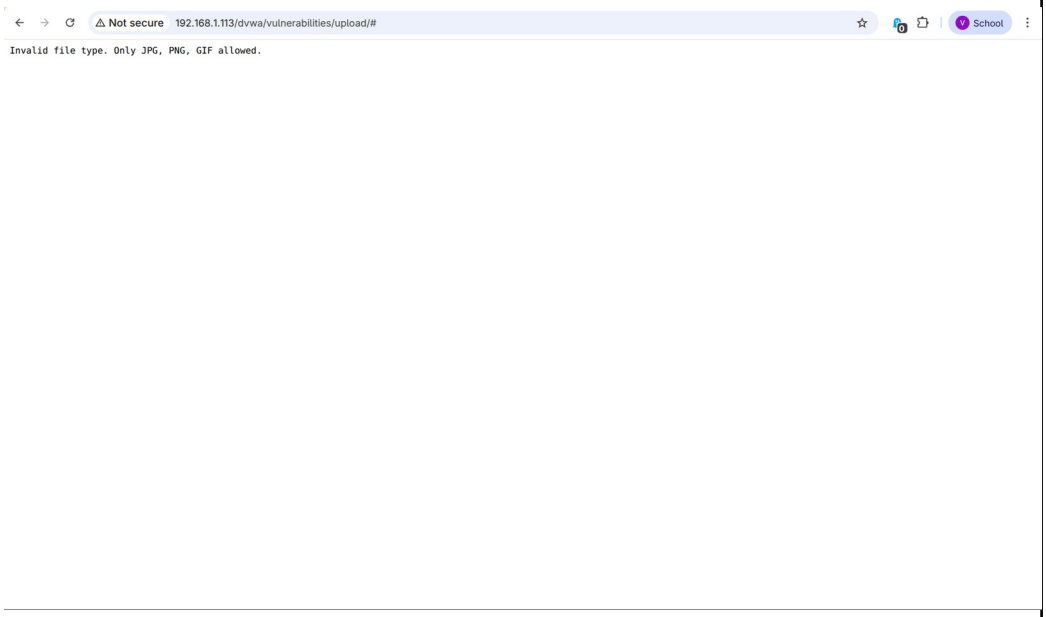
SQL INJECTION:

```
1 2 3 4                    Monday November 17, 1:10 PM                    53%
                           vishwajit-vm@linuxmint-VM: ~

) ssh -X vishwajit-vm@192.168.1.113
The authenticity of host '192.168.1.113 (192.168.1.113)' can't be established.
ED25519 key fingerprint is SHA256:spFHFAwp/b5XVXf7SmCkm4k8BamdNKPkEzwi6h1EY3I.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.113' (ED25519) to the list of known hosts.
vishwajit-vm@192.168.1.113's password:

vishwajit-vm@linuxmint-VM:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
vishwajit-vm@linuxmint-VM:~$ cat /var/www/html/dvwa/vulnerabilities/sqli/source/low.php
<?php

if( isset( $_REQUEST[ 'Submit' ] ) ) {
        // Get input
        $id = $_REQUEST[ 'id' ];
        $id = mysqli_real_escape_string($GLOBALS["___mysqli_ston"], $id);

        switch ($_DVWA['SQLI_DB']) {
                case MYSQL:
                        // Check database
                        $query  = "SELECT first_name, last_name FROM users WHERE user_id = '$id';";
                        $result = mysqli_query($GLOBALS["___mysqli_ston"],  $query ) or die( '<pre>' . ((is_object($GLOBALS["___mysqli_ston"])) ? mysqli_error
($GLOBALS["___mysqli_ston"]) : (($___mysqli_res = mysqli_connect_error()) ? $___mysqli_res : false)) . '</pre>' );

                        // Get results
                        while( $row = mysqli_fetch_assoc( $result ) ) {
                                // Get values
                                $first = $row["first_name"];
                                $last  = $row["last_name"];

                                // Feedback for end user
                                $html .= "<pre>ID: {$id}<br />First name: {$first}<br />Surname: {$last}</pre>";
                        }

                        mysqli_close($GLOBALS["___mysqli_ston"]);
                        break;
                case SQLITE:
                        global $sqlite_db_connection;
```



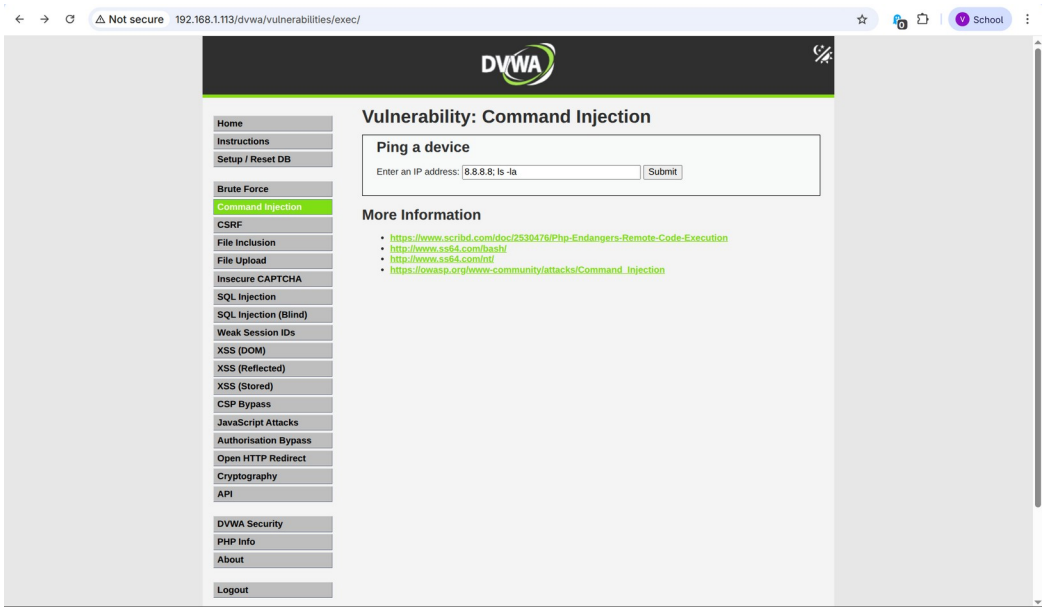
FILE UPLOAD:


Monday November 17, 1:23 PM
vishwajit-vm@linuxmint-VM: ~
vishwajit-vm@linuxmint-VM:~$ sudo vim /var/www/html/dvwa/vulnerabilities/upload/source/low.php
vishwajit-vm@linuxmint-VM:~$ cat /var/www/html/dvwa/vulnerabilities/upload/source/low.php
<?php
if (isset($_POST['Upload'])) {
$allowed_extensions = array('jpg', 'jpeg', 'png', 'gif');
$allowed_mime_types = array('image/jpeg', 'image/png', 'image/gif');
$file_name = $_FILES['uploaded']['name'];
$file_tmp = $_FILES['uploaded']['tmp_name'];
$file_ext = strtolower(pathinfo($file_name, PATHINFO_EXTENSION));
// Check extension
if (!in_array($file_ext, $allowed_extensions)) {
die("<pre>Invalid file type. Only JPG, PNG, GIF allowed.</pre>");
}
// Check MIME type
$mime = mime_content_type($file_tmp);
if (!in_array($mime, $allowed_mime_types)) {
die("<pre>Invalid MIME type. File is not an image.</pre>");
}
// Generate a safe random name
$new_name = uniqid("img_", true) . "." . $file_ext;
$target_path = DVWA_WEB_PAGE_TO_ROOT . "hackable/uploads/" . $new_name;
// Upload the file
if (!move_uploaded_file($file_tmp, $target_path)) {
echo "<pre>Your image was not uploaded.</pre>";
} else {
echo "<pre>File uploaded successfully as {$new_name}</pre>";
}
}
?>
vishwajit-vm@linuxmint-VM:~$


Not secure
192.168.1.113/dvwa/vulnerabilities/upload/#
School
Invalid file type. Only JPG, PNG, GIF allowed.

COMMAND INJECTION:

```
vishwajit-vm@linuxmint-VM:~$ sudo vim /var/www/html/dvwa/vulnerabilities/exec/source/low.php
vishwajit-vm@linuxmint-VM:~$ cat /var/www/html/dvwa/vulnerabilities/exec/source/low.php
<?php

if( isset( $_POST[ 'Submit' ]  ) ) {
        // Get input
        $target = $_REQUEST[ 'ip' ];

        // ALLOW ONLY valid IPv4 addresses
        if (!filter_var($target, FILTER_VALIDATE_IP, FILTER_FLAG_IPV4)) {
                die("<pre>Invalid IP address</pre>");
        }

        // Determine OS and execute the ping command.
        if( stristr( php_uname( 's' ), 'Windows NT' ) ) {
                // Windows
                $cmd = shell_exec( 'ping  ' . $target );
        }
        else {
                // *nix
                $cmd = shell_exec( 'ping  -c 4 ' . $target );
        }

        // Feedback for the end user
        $html .= "<pre>{$cmd}</pre>";
}

?>
vishwajit-vm@linuxmint-VM:~$
```


Not secure
192.168.1.113/dvwa/vulnerabilities/exec/
School
DVWA
Home
Instructions
Setup / Reset DB
Brute Force
Command Injection
CSRF
File Inclusion
File Upload
Insecure CAPTCHA
SQL Injection
SQL Injection (Blind)
Weak Session IDs
XSS (DOM)
XSS (Reflected)
XSS (Stored)
CSP Bypass
JavaScript Attacks
Authorisation Bypass
Open HTTP Redirect
Cryptography
API
DVWA Security
PHP Info
About
Logout
Vulnerability: Command Injection
Ping a device
Enter an IP address: 8.8.8.8; ls -la
Submit
More Information
https://www.scribd.com/doc/2530476/Php-Endangers-Remote-Code-Execution
http://www.ss64.com/bash/
http://www.ss64.com/nt/
https://owasp.org/www-community/attacks/Command_Injection