

## CSC368 Systems Programming Languages

IA Projects given to students:

1. Encryption/Decryption program in Perl - Students have to write a program to encrypt a file and another program to decrypt a file.

2. Management of cookies and web files in PHP - In lecture only.

Semester Offered: Fall 2008

Some snapshots:

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many guesses it takes for the user to guess it right. Display the count and a message of "Congratulation" after guessing correctly.

**2. Encryption/Decryption Program:**  
Write a program in Perl that can do encryption and decryption programs. An example of encryption program is that "a" becomes "z", and "b" becomes "y" and so on, or whatever shifting algorithm you can devise. The input file is any readable text file that is to be encrypted. When this input file is run against the encryption program, it encrypts the file with the use of your encryption algorithm and saves the processed file to an encrypted file with same file name but with an extension of ".inc".  
When you run the decryption program, it reads the encrypted file and decrypt (or reverse) it and save to same filename but with an extension of ".dec" which stands for decrypted file. The contents of the decrypted file should be same as the input file.  
This has some practical application like sending sensitive file through email. The sender can use the encryption program before sending a sensitive information and then the recipient can use the decryption program to be able to read the file.  
For example:  
Input File: OriginalFile.txt  
To run the encryption program: ./encryption.pl OriginalFile.txt  
Its output will be: OriginalFile.inc  
To run the decryption program: ./decryption.pl OriginalFile.inc  
Its output will be: OriginalFile.dec  
Please execute: chmod 711 filename to make your program not readable to others.

4 Midterm Exam  
Item is no longer available. It was last available on Oct 25, 2008 3:00 AM.

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### General Guidelines Setting a Cookie (1)

- If the cookie should last as long as the user browses through the site, don't set expiration time.
- If the cookie should continue to exist after the user has closed and reopened their browser, set an expiration time that's months in the future.
- If the cookie can constitute a security risk, set an expiration time of an hour or a fraction thereof so that the cookie doesn't continue to exist too long after a user has left the browser.
- The expiration time is set based on the server's time zone, but the browser may delete the cookie based on the client's time zone. Some browser do automatically correct the time difference between the server and Web browser.

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General Guidelines Setting a Cookie (2)

- For security purposes, set a five or ten-minute expiration time on a cookie and have the cookie re-sent with every new page the user visits. This way, the cookie will continue to persist as long as the user is active but will automatically die five or ten minutes after the user's last action.
- Setting the cookie's path to '/' makes the cookie accessible within an entire Web site.
- If the Web application involves sensitive information such as online banking or e-commerce, set up an SSL (Secure Sockets Layer) connection so that cookies can be sent securely.

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Example of Cookie's Expiration Date

```
<?php

// Address error handling.
ini_set('display_errors', 1);
error_reporting (E_ALL & ~E_NOTICE);

$cookies = FALSE; // Cookies have not been sent.

// Handle the form if it has been submitted.
if (isset ($_POST['submit'])) {
    // Send the cookies.
    setcookie ('bg_color', $_POST['bg_color'], time()+10000000, '/', '', 0);
    setcookie ('font_color', $_POST['font_color'], time()+10000000, '/', '', 0);
    $cookies = TRUE; // Cookies have been sent.
} // End of submit IF.

?>
```

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File Permissions (1)

Permissions identify who can do what to the file or directory. The options are *read*, *write* and *execute* (actually, files can be designated *executable*, whereas directories are made *searchable*). On top of that, these options can be set differently for three unique types of users: the *owner* of the file (the person who created or put it on the server); members of a particular *group*, which a server administrator sets; and *others* (those who don't fall into the previous two categories).

PHP needs to be able to write to some files and directories to be able to write to a file and directories. Being able to write to a file or directory can be a security issue and should only be designated an option when absolutely necessary.

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## File Permissions (2)

- Most OS have no PHP users. Instead, the PHP user is essentially the Web user application (example Apache, PWS, or IIS) is running as. On the Unix family, Apache often runs as *nobody*. On Windows, the Web server frequently runs as the same user who is logged in (and who probably created the file), meaning there be no need to alter a file's permissions.
- In Unix, Linux or Mac, `chmod 761 filename`, the 7 means *write* (2) plus *read* (4) plus *execute* (1) permission to the *owner*; the 6 means *write* (2) plus *read* (4) permission to the *group*; the 1 means *execute* (1) permission to *others*.
- PHP has several functions for changing a file or directory's permissions, including `chgrp()`, `chown()`, and `chmod()`. However, they will work only if PHP already has permission to modify the file or directory in question.

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### A More Secure File Structure

Having writable files and directories on the server is a bit of a security risk. If the Web server (and everyone else) can write to the file or directory, then malicious users can hack the system using this same gateway.

The best security measure to take in such instance is to place the writable files and directories outside of the Web directory. For example:  
`/home/netid/public_html/sites/`

The *sites* directory is where the writable files are stored. If possible give permission only to the locally running PHP program but not to others over the Internet.

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