

Homework 1 (25 points)

cs3157 – Advanced Programming
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Spring 2006

Due: Feb 19 11pm.

Objective:

1. Practice with some Perl coding/compiling/debugging
2. Get a taste of what Security programmers do.
3. Have fun!

Programming Part:

Someone has hacked into your computer and manipulated some set of files!!! That is very bad! (I was teaching a class at the time, so you can't pin this on your instructor).

Lucky for you, you have a snapshot of your system in which you noted each file, and their unique signature, which means you can easily run through all your current files and compare them to see which have been changed.

If the signature is not the same, it is an indication that something was changed. (Note we can manipulate a file without changing its size, so size is not an indication).

In addition to detecting file changes, we would like to run over a bunch of files, and be able to search for a specific file to get any individual signature.

So you will need to create the following Perl program:

- 1) Name it **security.pl** and run it in strict mode. (2 POINTS)
- 2) You will be judged on comments and formatting too! So please remember to document what you are doing and clean up your code with an automatic formatter or good practice. (3 POINTS)
- 3) For either bad arguments passed to your program or -?
Print out the correct arguments (see 4) and quit. (1 POINTS)
- 4) It should work in the following manner:
 - a. (8 POINTS) `security.pl -snapshot PATH -output NAME`
will recursively run through the location specified by **PATH**. For each file or directory you will need to take it's MD5 hash, and keep track of it in a

file called *NAME*

example: `security.pl -snapshot c:\temp -output TEST1`

will start at `c:\temp` and go down to all files there, and put the output into a file named `TEST1`

You have a choice to keep a relative path or full path, think about the differences and choose relative path.

- b. (4 POINTS) `security.pl -search FILENAME NAME`
will open a snapshot file `NAME` and search for a specific `FILENAME`, if it is present output its MD5 signature.
- c. (7 POINTS) `security.pl -compare NAME1 NAME2`
will compare two security files, for any file which has an identical MD5 signature, we can ignore. If a specific file is only in `NAME1` then printout:
file: XXXXXX has been deleted
if it is only in `NAME2` printout:
file: XXXXXX has been created
if a file has changed, print out
file: XXXXXX has been manipulated

TIPS:

In addition to submitting the Perl program, you will need to include a `README` file giving a sentence of what each file in the submission does.

Your code should never terminate unexpectedly. Check for all possible errors the user could make (non-existent file, non-existent directory, etc). When any user error occurs, exit gracefully with an appropriate error message

Make sure to divide your program into logical sections using subroutines and not one giant `main`! Also remember to use `strict`;

Code Style is graded on how easily read your source code is. For generic tips on improving your code's style, read **perldoc perlstyle**. Most important are three criteria: meaningful variable names, consistent and helpful indentation, and explanatory but not over-abundant comments.

Start early and Good Luck!!