Systems Programming: Coursework 1

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Module Of Study: Software Development For business

2017

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# User Guide

Follow the ‘getting started’ guide to initially setup the coursework file. Once ‘getting started’ is complete, please follow instructions for either ‘Using Getops’ or ‘Using the Menu’ to actually use the “trash.sh” file.

## Getting started

1. Move the “cw-2017.rar” folder to the desktop
2. Unzip “cw-2017.rar”
3. Open “cw-2017” directory and copy “trash”
4. Navigate to the ~/bin directory and paste the “trash” file
5. Open the bash terminal by key press; ctrl + alt + t
6. Use the “cd” command to enter the “bin” directory (cd bin)
7. Run the chmod 775 command on the file “trash” to allow it to read and execute (chmod 755 trash)
8. Go back to the “cw-2017” directory and copy the “monitor.sh” file
9. Go to the bin directory (cd bin) and paste the monitor.sh file
10. Open the bash terminal, go to “cd bin” and enter “chmod 755 monitor.sh”
11. Go back to home directory “cd ..”
12. Run the script by typing in “trash2 in the bash terminal t enure the /.trashdir.trash is created
13. Go to the “cw-2017” directory and copy the files named “testdirectory”, “testfile”, “test” and “trash test” to the /.trashdir.trash (once step 12 is completed)
14. Setup complete

## Before running commands – PLEASE READ!

Before running the commands on either the getops or the menu please ensure you look at the command list. The command list will show you all the possible commands that can be used within this script. However, you will notice there are commands such as remove all files and move files. Please ensure these commands are run at the end or this may result in the loss of the provided example files.

## Using Getops

1. Enter “trash” followed by any of the commands listed below (Please refer to the command list below - *eg trash -l*)
2. You can now use the getops functions

## Using the menu

1. Enter “trash” to load the menu
2. Enter a number from the list loaded on screen followed by the enter key to preform actions
3. You can now use the menu

## Command List and Output

|  |  |
| --- | --- |
| Command | Output |
| trash -l | Lists all files and folders in the trash directory |
| trash -g | ask for a file to move and if the specified file exists, it should be moved to the directory you are currently in. |
| trash -r | Delete contents of trash directory |
| trash -v | View a specified file |
| trash -u | view the selected users trash directory and its contents. |
| trash -t | all users in the system should be displayed and the size of each users trash directory should be shown in bytes. |
| trash -m | Begin monitor process |
| trash -k | Kill monitor process |

# Testing

## Functions and Getops Testing

|  |  |  |
| --- | --- | --- |
| Action | Expected | Outcome |
| output a list on screen of the contents of the trash directory; output should be properly formatted as “file name” (without path), “size” (in bytes) and “type” for each file ("trash -l") | Lists all files and folders in the trash directory with the file name, size and type; when “trash -l” is entered. | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\gt-l.png  Lists all files inside the trash directory with the name and size in bytes. Could not get it to display the file type unless it was a jpeg image. |
| get a specified file from the trash directory and place it in the current directory ("trash -g file") | When “trash -g” is entered it should ask for a file to move and if the specified file exists, it should be moved to the directory you are currently in. | File was moved to “ ~/bin ”C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\gt-g.png |
| remove interactively the contents of the trash directory ("trash -r") | When “trash -r” is entered all contents of the trash directory should be deleted and the trash directory should be empty. | All files were deleted from the trash directory. The trash directory is now empty. |
| view the contents of the specified file in the trash directory ("trash –v file") | When “trash -v filename” is entered, you should be able to view the files contents within the bash window. | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\gt-v1.png  C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\gt-v2.png  Views the file then “q” to quit. |

|  |  |  |
| --- | --- | --- |
| for a specified user list the contents of his/her trash directory (e.g. "trash -u username") | When “trash -u username” is entered, you should be able to view the selected users trash directory and its contents. | Allows you to type a students name in and then the contents of the trash directory is loaded on the screen. |
| displays total usage in bytes of trash directories for all users in the system ("trash –t") | When “trash -t” is entered, all users in the system should be displayed and the size of each users trash directory should be shown in bytes. | All users with a trash directory are calculated and displayed |
| start monitor script process (see requirements below i.e. "trash –m") | When “trash -m” is entered, the monitor script should run as a background process and … | Monitor Is running on a separate script. It displays the statistics of the trash directory. Not what it is supposed to do but couldn’t get it to work. |
| Entering action that does not exist (trash -e) | When “trash -e” is enterd, the sysem should return a message saying command does not exist. | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\gt-e.png |

|  |  |  |
| --- | --- | --- |
| Create trash directory when script runs | When any command runs it should mae sure the directory /.trashdir.trash is created. If yes, a message should be output. | When tested everytime the script ran it tried to create th trashdir. However on updated code “mkdir -p ~/.trashdir.trash” make it if it does not exist. |
| kill current user’s monitor script processes (i.e. "trash –k") | Should kill the monitor process when “trash -k” is entered | Monitor process if found and the PID which it is running is terminated |

## Menu Test

|  |  |  |
| --- | --- | --- |
| Action | Expected | Outcome |
| Load Menu | Menu is loaded with valid numbers that correspond to the functions | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\mnuld.png  Menu is loaded and the numbers corresponding to the functions are loaded. |
| Entering action that does not exist (10) | When and invalid number is entered, the script should return a message saying command does not exist. | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\mnu-uk.png  Shows valid error message when the option is not found. |
| Create trash directory when script runs | When any command runs it should mae sure the directory /.trashdir.trash is created. If yes, a message should be output. | C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\mnu-ct.png  When tested everytime the script ran it tried to create th trashdir. However on updated code “mkdir -p ~/.trashdir.trash” make it if it does not exist. |
| Menu Exit | Menu will simply exit | Menu exits |
| Enter 1 on menu load | Lists all files and folders in the trash directory with the file name, size and type |  |
| Enter 2 on menu load | ask for a file to move and if the specified file exists, it should be moved to the directory you are currently in. | Check to see if the error message is produced then proceed to see if it moves the file; which it does. |

|  |  |  |
| --- | --- | --- |
| Enter 3 on menu load | contents of the trash directory should be deleted and the trash directory should be empty. | Created a testfile to delete  C:\Users\Chris Campbell\AppData\Local\Microsoft\Windows\INetCacheContent.Word\rm1.png  Menu loaded, 3 entered, file was deleted |
| Enter 4 on menu load | you should be able to view the files contents within the bash window. | Menu is loaded and 4 is selected. User is prompted to enter file name.  File is loaded and displayed on bash window if It exists. |

|  |  |  |
| --- | --- | --- |
| Enter 5 on menu load | you should be able to view the selected users trash directory and its contents. | Student directory is selected and the contents of each file I displayed in bytes. |
| Enter 6 on menu load | all users in the system should be displayed and the size of each users trash directory should be shown in bytes. | All uses with the trash directory created is shown and theier file contents is dispayed.  Please note currenly only the student has the trashdir created. |

|  |  |  |
| --- | --- | --- |
| Enter 7 on menu load | the monitor script should run as a background process | Monitor script is running in the background and every 10 seconds it displays the stats for the tash directory |
| Enter 8 on menu load | Should kill the monitor process | When the monitor is running, when 9 is entered it kills the background process of the monitor.  When no monitor is running it does nothing |
| Enter 9 on menu load | The menu should exit and you should be back in the directory you were last in | 9 is entered and the menu is ended |

# Annotated Listing

## Trash Script

#!/bin/bash

##SCRIPT START

echo "Script Runing"

##CREATES DIRECTORY ~/.TRASH.SH IF NOT ALREADY CREATED

mkdir -p ~/.trashdir.trash

echo "-----------------"

## <------ FUNCTIONS --------->

listtrash(){

cd ~/.trashdir.trash ##GOES TO TRASH DIRECTORY

ls -l | awk '{print $9, $5}' ##PRINTS THE FILES PLUS SIZE AND NAME

}

searchmove(){

cd ~/.trashdir.trash ##GOES TO TRASH DIRECTORY

echo -n "Search File To Move? " ##PROMPTS USER TO ENTER MESSAGE

read searchfile ##READS THE FILE

if [ -f $searchfile ] ##IF SEARCH FILE EXITS...

then

mv $searchfile "$(dirname "$0")" ##MOVE TO CURRENT DIRECTORY

else

echo "no such file" ##ERROR MESSAGE

fi

}

rmtrash(){

rm -r ~/.trashdir.trash/\* ##REMOVES ALL FILES AND DIRECTORIES FROM TRASHDIR

echo "Files Removed"

}

viewfile(){

cd ~/.trashdir.trash ##GOES TO TRASH DIRECTORY

echo -n "file to view?"

read filetoview

less $filetoview ##DISPLAYS FILE IN BASH WINDOW

}

##FUNCTION TO SELECT DIRECTORY AND VIEW FILES

userdirectory(){

cd ~/.trashdir.trash

awk -F":" '$7 ~ /\/bin\/bash/ {print $1}' /etc/passwd

echo "select student: "

read users

if [ `id -u $users 2>/dev/null || echom-1` -ge 0 ]; then

cd /home/$users/.trashdir.trash

ls -l | awk '{print $9, $5}'

else

echo "User Not Found"

fi

}

##FUNCTION TO SEE TRASH DIRECTORY SIZE IN BYTES

userbytes(){

declare -A look

while IFS=: read -ra entry; do

look["${entry[0]}"]="${entry[5]}"

done < /etc/passwd

for user in "${!look[@]}"; do ##SEARCHES ALL USERS

dir="${look[$user]}/.trashdir.trash"

if [[ -d "$dir" ]]; then ##IF USER HAS TRASHDIR...

totalSize=$(du -sb "$dir" | awk '{print $1}') ##FIND THE SIZE OF THE TRASHDIR

printf "Total for user %s: %d\n" "$user" "$totalSize" ##PRINT SIZE OF TRASHDIR

##MISSING ADD FUNCTION...

fi

done

}

##KILLS MONITOR PROCESS

trapkill(){

PID=`ps -eaf | grep monitor.sh | grep -v grep | awk '{print $2}'` ##FINDS THE PID FOR THE MONITOR SCRIPT

if [[ "" != "$PID" ]]; then ##IF THE PID IS FOUND/RUNNING...

echo "killing $PID"

kill -9 $PID ##KILLS PROCESS

fi

}

##<-----END FUNCTIONS------->

##<-----GETOPS START-------->

##GETOPS FUNCTIONS LIST

while getopts ":l, g, r, v, u, t, m, k" opt; do

case $opt in

##LIST CONTENTS OF TRASH DIRECTORY

l)listtrash;;

##SERCHES AND MOVES SEARCHED FILE FROM TRASH TO CURRENT DIRECTORY

g)searchmove;;

##REMOVES ALL FILES FROM TRASH DIRECTORY

r)rmtrash;;

##SELECTS AND VIEWS FILE

v)viewfile;;

##GOES TO THE FUNCTION TO LOOK IN TRASH DIRECTORY FOR EACH USER

u)

echo "user spcified directory"

userdirectory;;

##GOES TO THE FUNCTION TO SEE FILE SIZE IN EACH DIRECTORY

t)userbytes;;

##RUNS THE MONITOR FILE IN THE BACKGROUND

m) echo "monitor processes..."

cd bin

sh ./monitor.sh &;;

##RUNS A TRAP TO STOP THE MONITOR PROCESS

k)trapkill;;

##RETURNS ERROR MESSAGE IF NO OPTION AVALIABLE

\?)

echo "Invalid option: -$OPTARG" >&2

;;

esac

done

#<-----GETOPS END-------->

#<-----MENU START-------->

USAGE="usage: $0"

PS3="select option> "

if (( $# == 0 ))

then

##LIST IOF MENU OPTIONS IN TEXT

select menu\_list in "List directory conent" "Move Files" "Remove all files" "View file contents" "view specified users directory" "total bytes all users" "Monitor Process" "Kill Monitor" "exit"

do

case $menu\_list in

##LIST CONTENTS OF TRASH DIRECTORY

"List directory conent")listtrash;;

##SERCHES AND MOVES SEARCHED FILE FROM TRASH TO CURRENT DIRECTORY

"Move Files")searchmove;;

##REMOVES ALL FILES FROM TRASH DIRECTORY

"Remove all files")rmtrash;;

##SELECTS AND VIEWS FILE

"View file contents")viewfile;;

##GOES TO THE FUNCTION TO LOOK IN TRASH DIRECTORY FOR EACH USER

"view specified users directory")userdirectory;;

##GOES TO THE FUNCTION TO SEE FILE SIZE IN EACH DIRECTORY

"total bytes all users")userbytes;;

##RUNS THE MONITOR FILE IN THE BACKGROUND

"Monitor Process")

echo "monitor processes..."

cd bin

sh monitor.sh &;; ##RUNS MONITOR SCRIPT IN BACKGROUND

##RUNS THE MONITOR FILE IN THE BACKGROUND

"Kill Monitor")trapkill;;

##EXIT ON EXIT

"exit") exit 0;;

##IF NO OPTION AVALIABLE THE RETURN ERROR MESSAGE

\*) echo "unknown option" 1>&2;;

esac

done

else echo $USAGE 1>&2; exit 1

fi

#<-----MENU END-------->

##END OF SCRIPT

## Monitor Script

#!/bin/bash

## -monitor processes

echo "monitor is running"

cd ~/.trashdir.trash ##MOVE TO TRASH DIRECTORY

##BEGIN INFINITE WHILE LOOP

while true

do

sleep 10 ##REPEATS EVERY 10 SECONDS

##SINGLE "#" IS THINGS IVE TRIED

#ls

#stat -c '%W %n %s %x %y' \* | sort -k1n

stat -f ~/.trashdir.trash ##LISTS THE STATS OF THE TRASH DIRECTORY

echo "------------------------"

##TEST

#find -cmin ~/.trashdir.trash

done