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15 Years OF ACHIEVING EXCELLENCE

DEPARTMENT OF DIGITAL & CYBER FORENSIC SCIENCE

LAB MANUAL

NAME OF THE SUBJECT: LINUX SYSTEM ADMINISTRATION LAB

SUBJECT CODE: 53P

SEMESTER: V

CLASS: III B.Sc., D&CFS

Prepared By **Approved By**

Subject Name:	**:**	LINUX SYSTEM ADMINISTRATION LAB
Department	**:**	DIGITAL AND CYBER FORENSIC SCIENCE
Class	**:**	III B.SC D&CFS
Semester	**:**	V

EXERCISE 1

Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.

EXERCISE 2

Write an awk script to find the number of characters, words and lines in a file?

EXERCISE 3

Write a Shell script that accepts a filename, starting and ending line numbers as arguments and displays all the lines between the given line numbers?

EXERCISE 4

Write a shell script to sort number in ascending order.

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Write a shell script (small calculator) that adds, subtracts, multiplies and divides the two given numbers.

EXERCISE 6

Write a shell script to determine whether a given number is a prime number or not.

EXERCISE 7

Write a shell script to print the first n Fibonacci numbers.

EXERCISE 8

Write a shell script to find the GCD of two given numbers.

EXERCISE 9

Write a shell script to check whether given string is palindrome or not.

EXERCISE 10

Write a shell script to find the factorial of given integer.

Prepared by **Verified by**

EXERCISE 1

Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.

AIM :

To create a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.

PROCEDURE :

1 Switch on your PC and open virtual box,

2 Click on the kali Linux OS and click green start button to boot – up the OS,

3 Wait until the boot process completes and login screen prompts,

4 Log in to the dcfs account with the password “hacker#3”,

5 Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6 `nano admin01.sh`

7 Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,

8 type the following command to execute the files as bash script,

9 `sh admin01.sh`

10 Note down the output in your observation.

ALGORITHM :

```
echo "The name of all files along with their permissions and user priviledges :"
for file in *
do
if [ -f $file ]
then
# if [ -r $file -a -w $file -a -x $file ]
# then
ls -l $file
# fi
fi
done
```

OUTPUT :

>>>$ sh admin01.sh

The name of all files along with their permissions and user privileges :

-rw-rw-r-- 1 dcfs dcfs 193 Jul 7 16:53 admin01.sh

-rw-rw-r-- 1 dcfs dcfs 381 May 10 15:23 bash02.sh

-rw-rw-r-- 1 dcfs dcfs 322 May 10 15:19 bash04.sh

-rw-rw-r-- 1 dcfs dcfs 1017 May 10 15:33 bash05.sh

-rw-rw-r-- 1 dcfs dcfs 1538 May 10 15:36 bash05.txt

-rw-rw-r-- 1 dcfs dcfs 206 Jul 6 10:45 bash06.sh

-rw-rw-r-- 1 dcfs dcfs 0 May 10 15:41 bash06.txt

-rw-rw-r-- 1 dcfs dcfs 309 May 10 15:52 bash07.sh

RESULT: The execution is successful and output verified which shows the files along with their permissions

EXERCISE 2

Write an awk script to find the number of characters, words and lines in a file?

AIM :

To create a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6. `nano admin02.awk`

7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,

9. `awk -f admin02.awk admin01.sh`

10. Note down the output in your observation.

ALGORITHM :

```
BEGIN{print "record.\t characters \t words"}
#BODY section
{
len=length($0)
total_len =len
print(NR,":\t",len,":\t",NF,$0)
words =NF
}
END{
print("\n total")
print("characters :\t" total len)
print("lines :\t" NR)
}
```

OUTPUT :

```
>>>$ awk -f admin02.awk admin01.sh
record.  characters       words
1 :   80 :          14 echo "The name of all files along with their permissions and user priviledges :"
2 :   13 :          4 for file in *
3 :   2 :  1 do
4 :   15 :          5 if [ -f $file ]
5 :   4 :  1 then
6 :   41 :          12 # if [ -r $file -a -w $file -a -x $file ]
7 :   6 :  2 # then
8 :   11 :          3 ls -l $file
9 :   4 :  2 # fi
10 :      2 :       1 fi
11 : 4 :  1 done
total
characters :     4
lines :   11
```

RESULT: The execution is successful and output verified which shows the number of words, letters and lines in a given file.

EXERCISE 3

Write a Shell script that accepts a filename, starting and ending line numbers as arguments and displays all the lines between the given line numbers?

AIM :

To write a Shell script that accepts a filename, starting and ending line numbers as arguments and displays all the lines between the given line numbers?

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6. `nano admin03.sh`

7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,

9. `sh admin03.sh`

10. Note down the output in your observation.

ALGORITHM :

```
ls
echo "Choose a file :"
read fname
echo "enter the beginning line number to read from"
read s
echo "enter the termination line number upto displayed with"
read n
echo "\e[1;31m Your file has these texts inbetween the lines you entered \e[0m"
echo "\e[1;42m"
sed -n $s,$n\p $fname | cat > newline
cat newline
```

OUTPUT :

```
>>>$ sh admin03.sh
admin01.sh   admin03.sh  bash04.sh  bash05.txt       bash06.txt  newline
admin02.awk  bash02.sh         bash05.sh  bash06.sh bash07.sh
Choose a file :
admin01.sh
enter the beginning line number to read from
3
enter the termination line number upto displayed with
6
Your file has these texts inbetween the lines you entered
do
if [ -f $file ]
then
# if [ -r $file -a -w $file -a -x $file ]
```

RESULT: The execution is successful and prints the contents as specified.

EXERCISE 4

Write a shell script to sort number in ascending order.

AIM :

To write a shell script to sort number in ascending order (Using Bubble sort method).

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,
6. `nano admin04.sh`
7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,
9. `bash admin04.sh`
10. Note down the output in your observation.

ALGORITHM :

```
arr=(10 8 20 100 12)
echo "Array in original order"
echo ${arr[*]}
for ((i = 0; i<5; i++))
do
   for((j = 0; j<5-i-1; j++))
   do
      if [ ${arr[j]} -gt ${arr[$((j+1))]} ]
      then
         temp=${arr[j]}
         arr[$j]=${arr[$((j+1))]}
         arr[$((j+1))]=$temp
      fi
   done
done
echo "Array in sorted order :"
echo ${arr[*]}
```

OUTPUT :

>>>$ bash admin04.sh

Array in original order

10 8 20 100 12

Array in sorted order :

8 10 12 20 100

RESULT: The execution is successful and the code sorts the given number in ascending order.

EXERCISE 5

Write a shell script (small calculator) that adds, subtracts, multiplies and divides the two given numbers.

AIM :

To write a shell script (small calculator) that adds, subtracts, multiplies and divides the two given numbers.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6. `nano admin05.sh`

7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,

9. `sh admin05.sh`

10. Note down the output in your observation.

ALGORITHM :

```
echo "Enter first number to be played with : "
read num1
echo "Enter second number to be played with : "
read num2
echo "playground games :"
echo "1) Addition"
echo "2) Subtraction"
echo "3) Multiplication"
echo "4) Division"
echo "Enter youe choice of game: "
read ch
case $ch in
1)res=`echo $num1 + $num2 | bc`
;;
2)res=`echo $num1 - $num2 | bc`
;;
3)res=`echo $num1 \* $num2 | bc`
;;
4)res=`echo "scale=2; $num1 / $num2" | bc`
;;
esac
echo "Result : $res"
```

OUTPUT :

```
>>>$ sh admin05.sh
Enter first number to be played with :
10
Enter second number to be played with :
11
playground games :
1) Addition
2) Subtraction
3) Multiplication
4) Division
Enter youe choice of game:
3
Result : 110
```

RESULT: The execution is successful and simple calculator is programmed.

EXERCISE 6

Write a shell script to determine whether a given number is a prime number or not.

AIM :

To write a shell script to determine whether a given number is a prime number or not.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,
6. `nano admin06.sh`
7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,
9. `sh admin06.sh`
10. Note down the output in your observation.

ALGORITHM :

```
echo "Enter a number to check for prime or not: "
read input_number
i=2
f=0
while test $i -le `expr $input_number / 2`
do
if test `expr $input_number % $i` -eq 0
then
f=1
fi
i=`expr $i + 1`
done
if test $f -eq 1
then
echo "The given number is not a Prime"
else
echo "The given number is a Prime"
fi
```

OUTPUT :

```
>>>$ sh admin06.sh
Enter a number to check for prime or not:
13
The given number is a Prime
$ sh admin06.sh
Enter a number to check for prime or not:
22
The given number is not a Prime
```

RESULT: The execution is successful and the code determines whether given number is prime or not.

EXERCISE 7

Write a shell script to print the first n Fibonacci numbers.

AIM :

To write a shell script to print the first n Fibonacci numbers.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6. `nano admin07.sh`

7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,

9. `bash admin07.sh`

10. Note down the output in your observation.

ALGORITHM :

```
echo "enter number of fibonacci sequence to be printed: "
read input
a=0
b=1
echo "The Fibonacci series is : "
for (( i=0; i<input; i++ ))
do
   echo -n "$a "
   fn=$((a + b))
   a=$b
   b=$fn
done
```

OUTPUT :

```
>>>$ bash admin07.sh
enter number of fibonacci sequence to be printed:
10
The Fibonacci series is :
0 1 1 2 3 5 8 13 21 34
$ bash admin07.sh
enter a number fibonacci sequence to be printed:
8
The Fibonacci series is :
0 1 1 2 3 5 8 13
```

RESULT: The execution is successful and fibonacci series are printed.

EXERCISE 8

Write a shell script to find the GCD of two given numbers.

AIM :

To write a shell script to find the GCD of two given numbers.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,
6. `nano admin08.sh`
7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,
9. `sh admin08.sh`
10. Note down the output in your observation.

ALGORITHM :

```
echo "Enter two numbers with space in between: "
read a b
m=$a
if [ $b -lt $m ]
then
m=$b
fi
while [ $m -ne 0 ]
do
x=`expr $a % $m`
y=`expr $b % $m`
if [ $x -eq 0 -a $y -eq 0 ]
then
echo Greatest Common Divisor of $a and $b is $m
break
fi
m=`expr $m - 1`
done
```

OUTPUT :

>>>$ sh admin08.sh

Enter two numbers with space in between:

121 517

gcd of 121 and 517 is 11

RESULT: The execution is successful and GCD of the given number found.

EXERCISE 9

Write a shell script to check whether given string is palindrome or not.

AIM :

To write a shell script to check whether given string is palindrome or not.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,

6. `nano admin09.sh`

7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,

9. `bash admin09.sh`

10. Note down the output in your observation.

ALGORITHM :

```
echo "Type a word to check"
read str
for i in $(seq 0 ${#str}) ; do
        revstr=${str:$i:1}$revstr
done
echo "The given word to check is " $str
echo "Its reverse of it is " $revstr
if [ "$str" = "$revstr" ]; then
        echo "It is a palindrome."
else
        echo "It is not a palindrome."
fi
```

OUTPUT :

```
>>>$ bash admin09.sh
Type a word to check
malayalam
The given word to check is  malayalam
Its reverse of it is  malayalam
It is a palindrome.
```

RESULT: The execution is successful and checks whether given string is palindromic or not.

EXERCISE 10

Write a shell script to find the factorial of given integer.

AIM :

To write a shell script to find the factorial of given integer.

PROCEDURE :

1. Switch on your PC and open virtual box,
2. Click on the kali Linux OS and click green start button to boot – up the OS,
3. Wait until the boot process completes and login screen prompts,
4. Log in to the dcfs account with the password “hacker#3”,
5. Click on the Terminal App in the dock below and create a file named “admin01.sh” with the following command,
6. `nano admin10.sh`
7. Type the algorithm in the field and save the file by pressing CTRL+O and exit out of the editor by pressing CTRL+X,
8. type the following command to execute the files as bash script,
9. `bash admin10.sh`
10. Note down the output in your observation.

ALGORITHM :

```
echo "Finding factorial using for loop :"
echo "Enter a number to get it's factorial"
read num
fact=1
for((i=2;i<=num;i++))
{
  fact=$((fact * i))
}
echo "the factorial of given number is: " $fact

################################################################################################

echo "Finding factorial using do-while :"
echo "Enter a number to find it's factorial"
read num
fact=1
while [ $num -gt 1 ]
do
  fact=$((fact * num))
  num=$((num - 1))
done
echo "the factorial of given number is: " $fact
```

OUTPUT :

```
>>>$ bash admin10.sh
Finding factorial using for loop :
Enter a number to get it's factorial
8
the factorial of given number is:  40320
Finding factorial using do-while :
Enter a number to find it's factorial
5
the factorial of given number is:  120
```

RESULT: The execution is successful and gives factorial of the given number.