1,2-exp8 : 3,4-exp9 :5-exp10: 6-exp11 : 7-exp12

8)
Implement the below
a) Write a shell script to reverse the word order in a list of strings. For example, if the input is Hello World, output should be World Hello.
b) Write a shell script to convert the user-given temperature in Celsius to Fahrenheit using a bash calculator.

a)

```
[centos@centos7 ~]$ nano rudra.txt
[centos@centos7 ~]$ cat rudra.txt
#! /bin/bash

echo "enter the string:"
read input

reversed=$(echo "$input" |
                '{for i=NF;
                  i>0;i-- )
                 printf "%s", $i;
                 print " "}')

echo "reversed string : $reversed"
```

```
[centos@centos7 ~]$ bash rudra.txt
enter the string:
Hello World
reversed string : WorldHello
```

b)

```
[centos@centos7 ~]$ nano rudra1.txt
[centos@centos7 ~]$ cat rudra1.txt
#! /bin/bash

echo "enter temperature in celsius:"
read celsius

fahrenheit=$(echo "scale=2; ($celsius * 9 / 5 ) +32 "| bc)

echo "$celsius C is equal to $fahrenheit F"

[centos@centos7 ~]$ bash rudra1.txt
enter temperature in celsius:
37
37 C is equal to 98.60 F
```

9 & 14 & 23)
Perform the following operations using yum package manager and interpret the output of command used:
a) List all installed packages
b) Describe the info of a package
c) Find out which package installed a particular file

a)

```
[centos@centos7 ~]$ yum list installed
Loaded plugins: fastestmirror, langpacks
Determining fastest mirrors
 * base: mirrors.piconets.webwerks.in
 * extras: mirrors.piconets.webwerks.in
 * updates: mirrors.piconets.webwerks.in
Installed Packages
GConf2.x86_64                           3.2.6-8.el7               @anaconda
GeoIP.x86_64                            1.5.0-14.el7              @anaconda
ModemManager.x86_64                     1.6.10-4.el7              @anaconda
ModemManager-glib.x86_64                1.6.10-4.el7              @anaconda
NetworkManager.x86_64                   1:1.18.8-2.el7_9          @updates
NetworkManager-adsl.x86_64              1:1.18.8-2.el7_9          @updates
```

b)

```
[centos@centos7 ~]$ yum info httpd
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirrors.piconets.webwerks.in
 * extras: mirrors.piconets.webwerks.in
 * updates: mirrors.piconets.webwerks.in
Available Packages
Name        : httpd
Arch        : x86_64
Version     : 2.4.6
Release     : 97.el7.centos.2
Size        : 2.7 M
Repo        : updates/7/x86_64
Summary     : Apache HTTP Server
URL         : http://httpd.apache.org/
License     : ASL 2.0
Description : The Apache HTTP Server is a powerful, efficient, and extensible
            : web server.
```

c)

```
[centos@centos7 ~]$ yum whatprovides /usr/bin/wget
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirrors.piconets.webwerks.in
 * extras: mirrors.piconets.webwerks.in
 * updates: mirrors.piconets.webwerks.in
wget-1.14-18.el7_6.1.x86_64 : A utility for retrieving files using the HTTP or
                            : FTP protocols
Repo        : base
Matched from:
Filename    : /usr/bin/wget



wget-1.14-18.el7_6.1.x86_64 : A utility for retrieving files using the HTTP or
                            : FTP protocols
Repo        : @anaconda
Matched from:
Filename    : /usr/bin/wget
```

10)

Demonstrate fdisk and df commands and interpret it’s output

i)fdisk

```
[centos@centos7 ~]$ sudo fdisk -l

Disk /dev/sda: 1073.7 GB, 1073741824000 bytes, 2097152000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x0004287b

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048     2099199     1048576   83  Linux
/dev/sda2         2099200  2097151999  1047526400   8e  Linux LVM

Disk /dev/mapper/centos-root: 963.5 GB, 963511320576 bytes, 1881858048 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes


Disk /dev/mapper/centos-swap: 4294 MB, 4294967296 bytes, 8388608 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

ii) df

```
[centos@centos7 ~]$ df -h
Filesystem               Size  Used Avail Use% Mounted on
devtmpfs                 903M     0  903M   0% /dev
tmpfs                    919M     0  919M   0% /dev/shm
tmpfs                    919M  9.5M  910M   2% /run
tmpfs                    919M     0  919M   0% /sys/fs/cgroup
/dev/mapper/centos-root  897G  4.8G  893G   1% /
/dev/sda1                976M  211M  699M  24% /boot
/dev/mapper/centos-home   98G  107M   98G   1% /home
tmpfs                    184M   20K  184M   1% /run/user/1000
```

11)
Implement the below

a) Write a shell script that consists of a function that displays the number of files in the present working directory. Name this function “file_count” and call it in your script.
b) Write a shell script to terminate the script if invoked by non-root user using function and appropriate exit codes.

a)

```
[centos@centos7 ~]$ nano rudra2.txt
[centos@centos7 ~]$ cat rudra2.txt
#! /bin/bash

file_count(){
        count=$(ls -l | grep -v '^d' | wc -l)
        echo "Number of files in the current directory: $count"
        }

file_count
[centos@centos7 ~]$ bash rudra2.txt
Number of files in the current directory: 4
```

b)

```
[centos@centos7 ~]$ nano rudra3.txt
[centos@centos7 ~]$ cat rudra3.txt
#! /bin/bash

if [ "$EUID" -ne 0 ]; then
        echo "Error: This script must be run as root. Exiting..."
        exit 1
fi
echo "Script is running as root. Continuing..."
[centos@centos7 ~]$ bash rudra3.txt
Error: This script must be run as root. Exiting...
```

12) Write a shell script to check the system status.

```
[centos@centos7 ~]$ nano system_status.sh
[centos@centos7 ~]$ cat system_status.sh
#! /bin/bash

echo "------------------------"
echo " SYSTEM STATUS REPORT"
echo "------------------------"

echo -e "\nUptime:"
uptime

echo -e "\nCPU Load:"
top -b -n1 | grep "Cpu(s)"

echo -e "\nMemory Usage:"
free -h

echo -e "\nLogged-i Users:"
who

echo -e "\nNetwork Iterfaces and IPs:"
ip a | grep inet
```

```
echo "------------------------"
echo " END OF REPORT "
echo "------------------------"

[centos@centos7 ~]$ bash system_status.sh
------------------------
 SYSTEM STATUS REPORT
------------------------

Uptime:
 06:35:53 up 45 min,  2 users,  load average: 0.21, 0.09, 0.07

CPU Load:
%Cpu(s):  6.2 us,  6.2 sy,  0.0 ni, 87.5 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st

Memory Usage:
              total        used        free      shared  buff/cache   available
Mem:           1.8G        731M        173M         23M        933M        932M
Swap:          4.0G          0B        4.0G

Logged-i Users:
centos   :0           2025-04-10 05:51 (:0)
centos   pts/0        2025-04-10 05:52 (:0)
```

```
Network Iterfaces and IPs:
    inet 127.0.0.1/8 scope host lo
    inet6 ::1/128 scope host
    inet 192.168.29.241/24 brd 192.168.29.255 scope global noprefixroute dynamic enp0s3
    inet6 2405:201:f:d042:b5ec:103a:cd60:f93a/64 scope global noprefixroute dynamic
    inet6 fe80::6eee:c462:7fe9:558a/64 scope link noprefixroute
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
------------------------
 END OF REPORT
------------------------
```

13)
Write a shell script to automate the following
a) Adding a user
b) Changing the group of the user

9 & 14 & 23)
Write a shell script to automate the following
a) Installing a package using yum
b) Checking package info using yum

15)
Write a shell script to check if the user is root.
a) Create a text file. Infer the file permissions.
b) Using the Octal mode change the permission on a particular file as rw-rw-r–
c) Using the Symbolic mode change the permission on a particular file as rw-rw-r–

```
[centos@centos7 ~]$ su
Password:
[root@centos7 centos]# mkdir rudra
[root@centos7 centos]# cd rudra
[root@centos7 rudra]# touch rudra1.txt
[root@centos7 rudra]# touch rudra2.txt
[root@centos7 rudra]# touch rudra3.txt
[root@centos7 rudra]# touch rudra4.txt
[root@centos7 rudra]# ls
rudra1.txt  rudra2.txt  rudra3.txt  rudra4.txt
[root@centos7 rudra]# ls -l
total 0
-rw-r--r--. 1 root root 0 Apr 10 06:44 rudra1.txt
-rw-r--r--. 1 root root 0 Apr 10 06:44 rudra2.txt
-rw-r--r--. 1 root root 0 Apr 10 06:44 rudra3.txt
-rw-r--r--. 1 root root 0 Apr 10 06:44 rudra4.txt
[root@centos7 rudra]#
[root@centos7 rudra]# chmod u+w rudra1.txt
[root@centos7 rudra]# ls -l | grep rudra1.txt
-rw-r--r--. 1 root root 0 Apr 10 06:44 rudra1.txt
[root@centos7 rudra]# chmod g+w rudra1.txt
[root@centos7 rudra]# ls -l | grep rudra1.txt
-rw-rw-r--. 1 root root 0 Apr 10 06:44 rudra1.txt
[root@centos7 rudra]# chmod 664 rudra1.txt
[root@centos7 rudra]# chmod 664 rudra1.txt
[root@centos7 rudra]# ls -l | grep rudra1.txt
-rw-rw-r--. 1 root root 0 Apr 10 06:44 rudra1.txt
[root@centos7 rudra]# chmod 664 rudra2.txt
[root@centos7 rudra]# ls -l | grep rudra2.txt
-rw-rw-r--. 1 root root 0 Apr 10 06:44 rudra2.txt
```

16)
Implement the below
a) Create a user by assigning the primary group explicitly.
b) Demonstrate the account status using the password aging settings and infer on the various account status.
c) Demonstrate locking and unlocking of the user password

```
[centos@centos7 ~]$ su
Password:
[root@centos7 centos]# chage -l centos
Last password change                                    : never
Password expires                                        : never
Password inactive                                       : never
Account expires                                         : never
Minimum number of days between password change          : 0
Maximum number of days between password change          : 99999
Number of days of warning before password expires       : 7
[root@centos7 centos]# passwd -l centos
Locking password for user centos.
passwd: Success
[root@centos7 centos]# passwd -S centos
centos LK 1969-12-30 0 99999 7 -1 (Password locked.)
[root@centos7 centos]# passwd -u centos
Unlocking password for user centos.
passwd: Success
[root@centos7 centos]# passwd -S centos
centos PS 1969-12-30 0 99999 7 -1 (Password set, SHA512 crypt.)
```

17)
Demonstrate any five basic commands, five networking commands and interpret the same.

5 Basic Linux commands

i) pwd (Print Working Directory

```
[centos@centos7 ~]$ pwd
/home/centos
```

ii) ls (List Directory contents)]

```
[centos@centos7 ~]$ ls -l
total 20
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Desktop
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Documents
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Downloads
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Music
drwxr-xr-x. 2 centos centos 147 Apr 10 06:04 Pictures
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Public
drwxr-xr-x. 2 root   root    78 Apr 10 06:44 rudra
-rw-rw-r--. 1 centos centos 170 Apr 10 06:13 rudra1.txt
-rw-rw-r--. 1 centos centos 139 Apr 10 06:23 rudra2.txt
-rw-rw-r--. 1 centos centos 159 Apr 10 06:29 rudra3.txt
-rw-rw-r--. 1 centos centos 169 Apr 10 05:57 rudra.txt
-rw-rw-r--. 1 centos centos 400 Apr 10 06:35 system_status.sh
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Templates
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Videos
```

iii) cd (Change Directory)

```
[centos@centos7 ~]$ cd rudra
[centos@centos7 rudra]$ cd ..
[centos@centos7 ~]$
```

iv) mkdir (Create Directory)

```
[centos@centos7 ~]$ mkdir save
[centos@centos7 ~]$ ls -l
total 20
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Desktop
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Documents
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Downloads
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Music
drwxr-xr-x. 2 centos centos 147 Apr 10 06:04 Pictures
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Public
drwxr-xr-x. 2 root   root    78 Apr 10 06:44 rudra
-rw-rw-r--. 1 centos centos 170 Apr 10 06:13 rudra1.txt
-rw-rw-r--. 1 centos centos 139 Apr 10 06:23 rudra2.txt
-rw-rw-r--. 1 centos centos 159 Apr 10 06:29 rudra3.txt
-rw-rw-r--. 1 centos centos 169 Apr 10 05:57 rudra.txt
drwxrwxr-x. 2 centos centos   6 Apr 10 07:01 save
-rw-rw-r--. 1 centos centos 400 Apr 10 06:35 system_status.sh
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Templates
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Videos
```

v) rmdir (Remove Files or directories)

```
[centos@centos7 ~]$ rmdir save
[centos@centos7 ~]$ ls -l
total 20
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Desktop
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Documents
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Downloads
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Music
drwxr-xr-x. 2 centos centos 147 Apr 10 06:04 Pictures
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Public
drwxr-xr-x. 2 root   root    78 Apr 10 06:44 rudra
-rw-rw-r--. 1 centos centos 170 Apr 10 06:13 rudra1.txt
-rw-rw-r--. 1 centos centos 139 Apr 10 06:23 rudra2.txt
-rw-rw-r--. 1 centos centos 159 Apr 10 06:29 rudra3.txt
-rw-rw-r--. 1 centos centos 169 Apr 10 05:57 rudra.txt
-rw-rw-r--. 1 centos centos 400 Apr 10 06:35 system_status.sh
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Templates
drwxr-xr-x. 2 centos centos   6 Nov 26  2020 Videos
```

5 Networking Commands

i) ifconfig

```
[centos@centos7 ~]$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.241  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 fe80::6eee:c462:7fe9:558a  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:f:d042:b5ec:103a:cd60:f93a  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:d6:58:75  txqueuelen 1000  (Ethernet)
        RX packets 43260  bytes 61252864 (58.4 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 9531  bytes 675987 (660.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

ii) Ping

```
[centos@centos7 ~]$ ping google.com
PING google.com (142.250.70.110) 56(84) bytes of data.
64 bytes from pnbomb-ac-in-f14.1e100.net (142.250.70.110): icmp_seq=1 ttl=111 time=25.3 ms
64 bytes from pnbomb-ac-in-f14.1e100.net (142.250.70.110): icmp_seq=2 ttl=111 time=26.0 ms
64 bytes from pnbomb-ac-in-f14.1e100.net (142.250.70.110): icmp_seq=3 ttl=111 time=24.9 ms
64 bytes from pnbomb-ac-in-f14.1e100.net (142.250.70.110): icmp_seq=4 ttl=111 time=15.1 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 15.143/22.887/26.053/4.491 ms
```

iii) netstat (List Listening ports)

```
[centos@centos7 ~]$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 centos7.linuxvmim:59330 43.240.66.200:http      TIME_WAIT
tcp        0      0 centos7.linuxvmim:59326 43.240.66.200:http      TIME_WAIT
tcp        0      0 centos7.linuxvmim:59338 43.240.66.200:http      TIME_WAIT
tcp        0      0 centos7.linuxvmim:59334 43.240.66.200:http      TIME_WAIT
tcp6       0      1 centos7.linuxvmim:56608 2401:7500:fff5:1:::http SYN_SENT
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    18964    /var/run/chrony/chronyd.sock
unix  2      [ ]         DGRAM                    12382    /run/systemd/shutdownd
unix  3      [ ]         DGRAM                    7646     /run/systemd/notify
unix  2      [ ]         DGRAM                    7648     /run/systemd/cgroups-agent
```

iv) hostname

```
[centos@centos7 ~]$ hostname
centos7.linuxvmimages.local
```

v) curl (Transfer data from urls

```
[centos@centos7 ~]$ curl https://api.github.com/users/octocat
{
  "login": "octocat",
  "id": 583231,
  "node_id": "MDQ6VXNlcjU4MzIzMQ==",
  "avatar_url": "https://avatars.githubusercontent.com/u/583231?v=4",
```

18)
Demonstrate any five low and high level package managers in Red Hat distribution.

19)
Implement the following
a) Create two arrays with some elements. Concatenate the two arrays to create the third array. Display all three arrays.
b) Load the content of a file into an array and display the contents using for loop.

a)

```
[centos@centos7 ~]$ nano save.txt
[centos@centos7 ~]$ cat save.txt
#! /bin/bash

array1=(1,2,3,4)
array2=(5,6,7,8)

array3= ("${array1[@]}" "${array2[@]}")

echo "Array 1: ${array1[@]}"
echo "Array 2: ${array2[@]}"
echo "Concatenated Array 3: ${array3[@]}"

[centos@centos7 ~]$ bash save.txt
save.txt: line 6: syntax error near unexpected token `('
save.txt: line 6: `array3= ("${array1[@]}" "${array2[@]}")'
[centos@centos7 ~]$ nano save.txt
[centos@centos7 ~]$ bash save.txt
Array 1: 1,2,3,4
Array 2: 5,6,7,8
Concatenated Array 3: 1,2,3,4 5,6,7,8
```

b)

20)
Write a shell script that consists of a function that displays the number of files in the present working directory. Name this function “file_count” and call it in your script. If you use variable in your function, make it a local variable.

```
[centos@centos7 ~]$ nano rudra2.txt
[centos@centos7 ~]$ cat rudra2.txt
#! /bin/bash

file_count(){
        local count=$(ls -p | grep -v / | wc -l)
        echo "Number of files in the current directory: $count"
        }

file_count
[centos@centos7 ~]$ bash rudra2.txt
Number of files in the current directory: 6
```

21)
Write a shell script to find factorial of given command line arg using recursion. If the commandline argument (the number) is missing, display a message explaining the usage of this function.

22) Write a shell script to automate the following
a) Adding a user
b) Check password status
c) Create / Change Password

9 & 14 & 23)
Write a shell script to automate the following
a) Check Available packages using yum
b) Check Installed packages using yum

24) Implement the following:
a) Create a user
i) with a home directory
ii) with tcsh as the default shell
iii) with “Temp” in the comment field
iv) with user id
b) Demonstrate locking and unlocking of the user password for any one user

25)
Write a shell script using case to create a new file and delete an existing file.
bash script.sh --create newfile.txt should create this new file and
bash script.sh --delete newfile.txt should delete this existing file.
Display "Not a valid argument" if neither --create nor --delete is specified.