

Operating Systems Lab Assessment - 1

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Ques. 1 - Study of basic Linux commands.

Ans. 1 -

Commands:

```
~$ whoami
```

```
~$ who
```

```
~$ w
```

```
~$ cal
```

```
~$ date
```

```
~$ ls
```

```
~$ ls -l
```

```
~$ ls -la
```

Output:

```
wolf@Karan:~$ whoami
wolf
wolf@Karan:~$ w
 09:24:59 up 15 min,  1 user,  load average: 1.04, 0.80, 0.62
USER  TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
wolf  :0                14:39    ?xdm?    6:49    0.00s  /usr/lib/gdm3/g
wolf@Karan:~$ who
wolf  :0                2020-08-30 14:39 (:0)
wolf@Karan:~$ cal
      August 2020
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
wolf@Karan:~$ date
Sunday 30 August 2020 09:25:48 AM IST
wolf@Karan:~$ ls
Desktop  Downloads  Music      Pictures  sndcpy
Documents  GitHub    'Phone Transfer'  snap      Videos
wolf@Karan:~$ ls -l
total 40
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Desktop
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:38 Documents
drwxr-xr-x 2 wolf wolf 4096 Aug 30 09:20 Downloads
drwxrwxr-x 4 wolf wolf 4096 Aug 17 19:21 GitHub
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Music
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:30 'Phone Transfer'
drwxr-xr-x 4 wolf wolf 4096 Aug 22 18:44 Pictures
drwxr-xr-x 8 wolf wolf 4096 Aug  8 00:11 snap
drwxrwxr-x 2 wolf wolf 4096 Aug 18 16:09 sndcpy
drwxrwxr-x 2 wolf wolf 4096 Aug 10 19:05 Videos
wolf@Karan:~$ ls -la
total 184
drwxr-xr-x 31 wolf wolf  4096 Aug 23 19:09 .
drwxr-xr-x  3 root root  4096 Jul 23 00:27 ..
drwxr-xr-x  2 wolf wolf  4096 Aug  7 12:37 .android
-rw-r--r--  1 wolf wolf 23599 Aug 26 13:35 .bash_history
-rw-r--r--  1 wolf wolf   220 Jul 23 00:27 .bash_logout
-rw-r--r--  1 wolf wolf  3770 Jul 31 01:34 .bashrc
drwxr-xr-x 22 wolf wolf  4096 Aug 30 09:13 .cache
drwxrwxr-x  3 wolf wolf  4096 Aug 17 18:52 .cargo
drwxr-xr-x 46 wolf wolf  4096 Aug 30 09:13 .config
drwxrwxr-x  2 wolf wolf  4096 Jul 28 08:45 Desktop
drwxrwxr-x  2 wolf wolf  4096 Aug 10 20:38 Documents
drwxr-xr-x  2 wolf wolf  4096 Aug 30 09:20 Downloads
drwxrwxr-x  2 wolf wolf  4096 Jul 24 22:41 .easystroke
drwxrwxr-x  4 wolf wolf  4096 Jul 23 20:01 .gem
drwxrwxr-x  4 wolf wolf  4096 Aug 17 19:21 GitHub
drwxr-xr-x  3 wolf wolf  4096 Jul 28 19:15 .gnome
drwxr-xr-x  3 wolf wolf  4096 Aug 28 11:50 .gnupg
drwxrwxr-x  2 wolf wolf  4096 Aug 20 15:23 .gphoto
-rw-rw-r--  1 wolf wolf   25 Jul 25 10:49 .gtkrc-2.0
drwxrwxr-x  5 wolf wolf  4096 Aug  2 18:46 .icons
drwxrwxr-x  3 wolf wolf  4096 Jul 25 10:49 .kde
drwxr-xr-x  3 wolf wolf  4096 Jul 23 06:02 .local
drwxr-xr-x  6 wolf wolf  4096 Jul 27 03:51 .mozilla
drwxrwxr-x  2 wolf wolf  4096 Jul 28 08:45 Music
drwxrwxr-x  2 wolf wolf  4096 Aug 10 20:30 'Phone Transfer'
drwxr-xr-x  4 wolf wolf  4096 Aug 22 18:44 Pictures
drwxr-xr-x  3 wolf wolf  4096 Jul 28 19:14 .pki
-rw-r--r--  1 wolf wolf   807 Jul 23 00:27 .profile
-rw-r--r--  1 wolf wolf   12 Jul 24 02:39 .python_history
drwxr-xr-x  8 wolf wolf  4096 Aug  8 00:11 snap
drwxrwxr-x  2 wolf wolf  4096 Aug 18 16:09 sndcpy
drwxr-xr-x  2 wolf wolf  4096 Aug 11 10:15 .ssh
drwxrwxr-x  5 wolf wolf  4096 Aug  7 17:32 .ssr
-rw-r--r--  1 wolf wolf    0 Jul 28 19:14 .sudo_as_admin_successful
drwxrwxr-x  7 wolf wolf  4096 Aug 10 20:32 .themes
drwxr-xr-x  6 wolf wolf  4096 Jul 28 19:37 .thunderbird
drwxrwxr-x  2 wolf wolf  4096 Aug 10 19:05 Videos
-rw-r--r--  1 wolf wolf 9072 Aug 23 19:08 .viminfo
drwxrwxr-x  3 wolf wolf  4096 Aug  3 15:30 .vscode
wolf@Karan:~$
```

```
wolf@Karan:~$ ls -l
total 40
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Desktop
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:38 Documents
drwxr-xr-x 2 wolf wolf 4096 Aug 30 09:20 Downloads
drwxrwxr-x 4 wolf wolf 4096 Aug 17 19:21 GitHub
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Music
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:30 'Phone Transfer'
drwxr-xr-x 4 wolf wolf 4096 Aug 22 18:44 Pictures
drwxr-xr-x 8 wolf wolf 4096 Aug  8 00:11 snap
drwxrwxr-x 2 wolf wolf 4096 Aug 18 16:09 sndcpy
drwxrwxr-x 2 wolf wolf 4096 Aug 10 19:05 Videos
wolf@Karan:~$ ls -la
total 184
drwxr-xr-x 31 wolf wolf  4096 Aug 23 19:09 .
drwxr-xr-x  3 root root  4096 Jul 23 00:27 ..
drwxr-xr-x  2 wolf wolf  4096 Aug  7 12:37 .android
-rw-r--r--  1 wolf wolf 23599 Aug 26 13:35 .bash_history
-rw-r--r--  1 wolf wolf   220 Jul 23 00:27 .bash_logout
-rw-r--r--  1 wolf wolf  3770 Jul 31 01:34 .bashrc
drwxr-xr-x 22 wolf wolf  4096 Aug 30 09:13 .cache
drwxrwxr-x  3 wolf wolf  4096 Aug 17 18:52 .cargo
drwxr-xr-x 46 wolf wolf  4096 Aug 30 09:13 .config
drwxrwxr-x  2 wolf wolf  4096 Jul 28 08:45 Desktop
drwxrwxr-x  2 wolf wolf  4096 Aug 10 20:38 Documents
drwxr-xr-x  2 wolf wolf  4096 Aug 30 09:20 Downloads
drwxrwxr-x  2 wolf wolf  4096 Jul 24 22:41 .easystroke
drwxrwxr-x  4 wolf wolf  4096 Jul 23 20:01 .gem
drwxrwxr-x  4 wolf wolf  4096 Aug 17 19:21 GitHub
drwxr-xr-x  3 wolf wolf  4096 Jul 28 19:15 .gnome
drwxr-xr-x  3 wolf wolf  4096 Aug 28 11:50 .gnupg
drwxrwxr-x  2 wolf wolf  4096 Aug 20 15:23 .gphoto
-rw-rw-r--  1 wolf wolf   25 Jul 25 10:49 .gtkrc-2.0
drwxrwxr-x  5 wolf wolf  4096 Aug  2 18:46 .icons
drwxrwxr-x  3 wolf wolf  4096 Jul 25 10:49 .kde
drwxr-xr-x  3 wolf wolf  4096 Jul 23 06:02 .local
drwxr-xr-x  6 wolf wolf  4096 Jul 27 03:51 .mozilla
drwxrwxr-x  2 wolf wolf  4096 Jul 28 08:45 Music
drwxrwxr-x  2 wolf wolf  4096 Aug 10 20:30 'Phone Transfer'
drwxr-xr-x  4 wolf wolf  4096 Aug 22 18:44 Pictures
drwxr-xr-x  3 wolf wolf  4096 Jul 28 19:14 .pki
-rw-r--r--  1 wolf wolf   807 Jul 23 00:27 .profile
-rw-r--r--  1 wolf wolf   12 Jul 24 02:39 .python_history
drwxr-xr-x  8 wolf wolf  4096 Aug  8 00:11 snap
drwxrwxr-x  2 wolf wolf  4096 Aug 18 16:09 sndcpy
drwxr-xr-x  2 wolf wolf  4096 Aug 11 10:15 .ssh
drwxrwxr-x  5 wolf wolf  4096 Aug  7 17:32 .ssr
-rw-r--r--  1 wolf wolf    0 Jul 28 19:14 .sudo_as_admin_successful
drwxrwxr-x  7 wolf wolf  4096 Aug 10 20:32 .themes
drwxr-xr-x  6 wolf wolf  4096 Jul 28 19:37 .thunderbird
drwxrwxr-x  2 wolf wolf  4096 Aug 10 19:05 Videos
-rw-r--r--  1 wolf wolf 9072 Aug 23 19:08 .viminfo
drwxrwxr-x  3 wolf wolf  4096 Aug  3 15:30 .vscode
wolf@Karan:~$
```

Ques. 2 - Write a shell script to swap two numbers without using a 3rd variable.

Ans. 2 -

Script:


1 0
2 1 0
3 2 1 0
4 3 2 1 0
5 4 3 2 1 0
6 5 4 3 2 1 0
7 6 5 4 3 2 1 0
8 7 6 5 4 3 2 1 0
9 8 7 6 5 4 3 2 1 0

Script:

Script:

```
#!/bin/bash
x=1
while [ "$x" -lt 10 ]
do
    y="$x"
    while [ "$y" -ge 0 ]
    do
        echo -n "$y"
        y=`expr $y - 1`
    done
    echo
    x=`expr $x + 1`
done
```

Output:

A terminal window with a dark background and light text. The window title is 'wolf@Karan: ~'. The prompt is 'wolf@Karan:~\$'. The user enters 'gedit Ques3.sh', then 'chmod 755 Ques3.sh', and finally './Ques3.sh'. The script outputs the first 10 Fibonacci numbers: 10, 210, 3210, 43210, 543210, 6543210, 76543210, 876543210, 9876543210, and 0. The prompt returns to 'wolf@Karan:~\$' with a cursor.

```
wolf@Karan:~$ gedit Ques3.sh
wolf@Karan:~$ chmod 755 Ques3.sh
wolf@Karan:~$ ./Ques3.sh
10
210
3210
43210
543210
6543210
76543210
876543210
9876543210
0
wolf@Karan:~$
```

Ques. 4 - Write a shell script to find the sum of first 'N' numbers in Fibonacci series (use for loop).

Ans. 4 -

Script:

```
wolf@Karan: ~  
#!/bin/bash  
echo "Enter length of series: "  
read n  
x=0  
y=1  
sum=0  
echo "fibonacci series: "  
for ((i=0; i<n; i++))  
do  
    echo "$x"  
    f_series=$(( x + y ))  
    sum=$(( sum + x ))  
    x=$y  
    y=$f_series  
done  
echo "Sum of Fibonacci Series = $sum"  
~  
~  
~  
~  
~  
~  
"Ques4.sh" 16L, 233C 1,1 All
```

Output:

```
wolf@Karan: ~$ vi Ques4.sh  
wolf@Karan: ~$ chmod 755 Ques4.sh  
wolf@Karan: ~$ ./Ques4.sh  
Enter length of series:  
7  
fibonacci series:  
0  
1  
1  
2  
3  
5  
8  
Sum of Fibonacci Series = 20  
wolf@Karan: ~$
```

Ques. 5 - Write a shell script to print a given number in reverse order and sum of the individual digits.

Ans. 5 -

Script:

```
wolf@Karan: ~  
❯ ./bin/bash  
echo "Enter the number: "  
read n  
d=0  
reverse=0  
sum=0  
while [ $n -gt 0 ]  
do  
    d=$(( $n % 10 ))  
    sum=$(( $sum + $d ))  
    reverse=$(( $reverse * 10 + $d ))  
    n=$(( $n / 10 ))  
done  
echo "Reverse of the Number = $reverse"  
echo "Sum of the digits = $sum"
```

"Ques5.sh" 15L, 258C

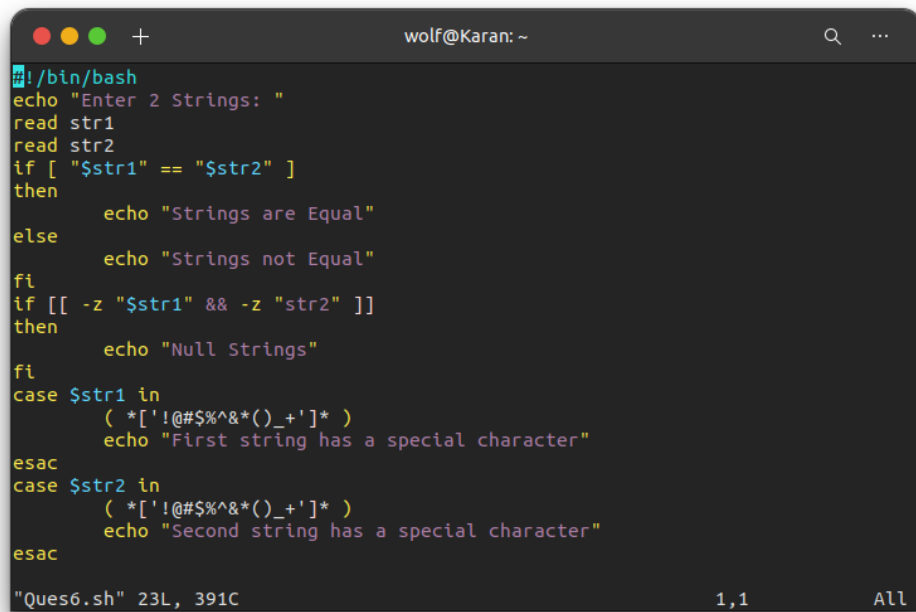
Output:

```
wolf@Karan:~$ gedit Ques5.sh
wolf@Karan:~$ chmod 755 Ques5.sh
wolf@Karan:~$ ./Ques5.sh
Enter the number:
1234
Reverse of the Number = 4321
Sum of the digits = 10
wolf@Karan:~$ ./Ques5.sh
Enter the number:
234098
Reverse of the Number = 890432
Sum of the digits = 26
wolf@Karan:~$
```

Ques. 6 - Write a shell script to read two strings and display whether it is equal, not equal, null strings or string with special characters.

Ans. 6 -

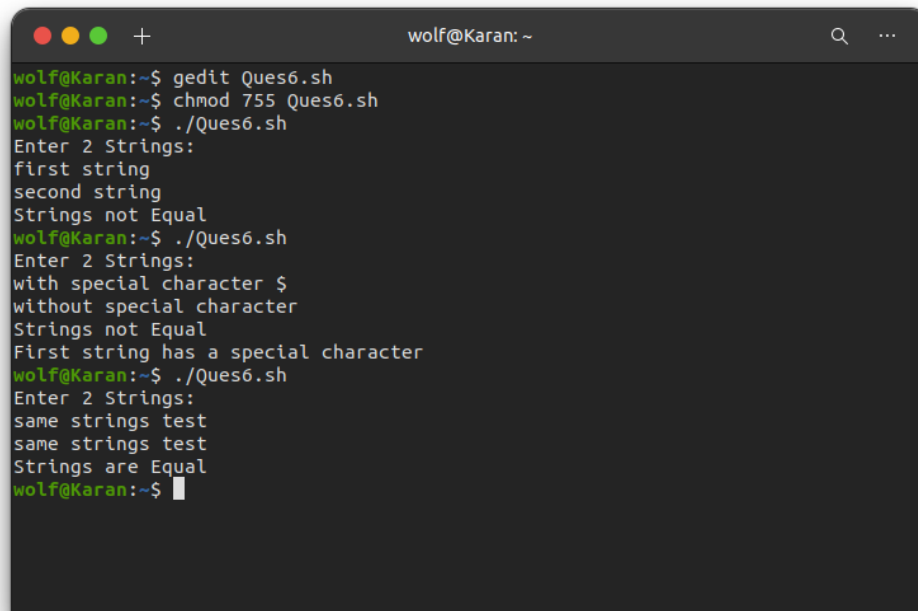
Script:



```
#!/bin/bash
echo "Enter 2 Strings: "
read str1
read str2
if [ "$str1" == "$str2" ]
then
    echo "Strings are Equal"
else
    echo "Strings not Equal"
fi
if [[ -z "$str1" && -z "$str2" ]]
then
    echo "Null Strings"
fi
case $str1 in
    (*[!@#%&*()_+]* )
        echo "First string has a special character"
esac
case $str2 in
    (*[!@#%&*()_+]* )
        echo "Second string has a special character"
esac
```

"Ques6.sh" 23L, 391C 1,1 All

Output:



```
wolf@Karan:~$ gedit Ques6.sh
wolf@Karan:~$ chmod 755 Ques6.sh
wolf@Karan:~$ ./Ques6.sh
Enter 2 Strings:
first string
second string
Strings not Equal
wolf@Karan:~$ ./Ques6.sh
Enter 2 Strings:
with special character $
without special character
Strings not Equal
First string has a special character
wolf@Karan:~$ ./Ques6.sh
Enter 2 Strings:
same strings test
same strings test
Strings are Equal
wolf@Karan:~$
```

Ques. 7 - Write a shell script to accept one integer argument and print its multiplication table.

Script:

[illegible]

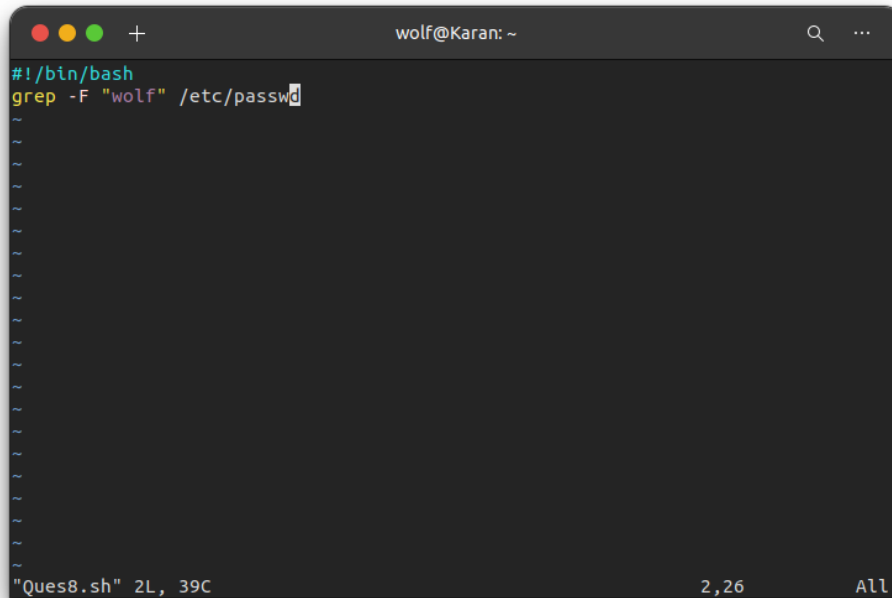
Output:

```
wolf@Karan: ~$ gedit Ques7.sh
wolf@Karan:~$ chmod 755 Ques7.sh
wolf@Karan:~$ ./Ques7.sh
Enter a number:
34
34 x 0 = 0
34 x 1 = 34
34 x 2 = 68
34 x 3 = 102
34 x 4 = 136
34 x 5 = 170
34 x 6 = 204
34 x 7 = 238
34 x 8 = 272
34 x 9 = 306
34 x 10 = 340
34 x 11 = 374
34 x 12 = 408
wolf@Karan:~$
```

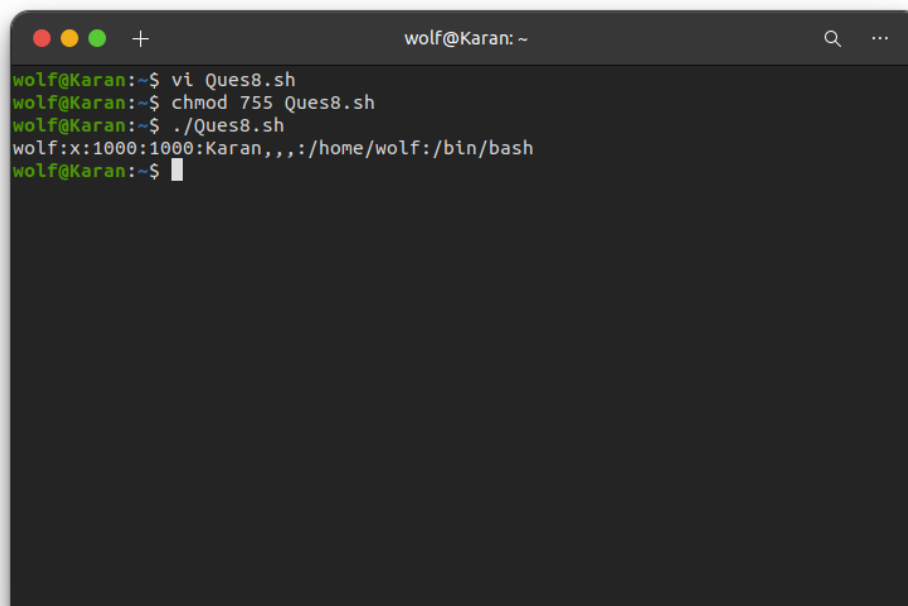
Ques. 8 - Write a Shell Script that makes use of grep to isolate the line in /etc/passwd that contains your login details.

Ans. 8 -

Script:

A terminal window titled 'wolf@Karan: ~' with a dark background. The window shows the content of a file named 'Ques8.sh'. The first line is '#!/bin/bash' in blue. The second line is 'grep -F "wolf" /etc/passwd' in green. The rest of the file is empty, indicated by tilde symbols. The status bar at the bottom shows '"Ques8.sh" 2L, 39C', '2,26', and 'All'.

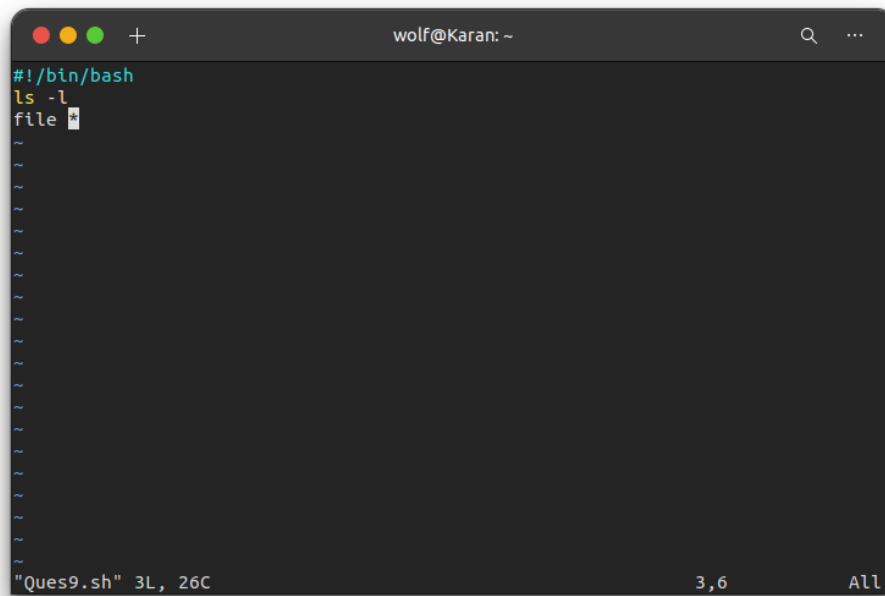
Output:

A terminal window titled 'wolf@Karan: ~' with a dark background. It shows the execution of the script 'Ques8.sh'. The commands and their outputs are: 'vi Ques8.sh' (no output), 'chmod 755 Ques8.sh' (no output), './Ques8.sh' (output: 'wolf:x:1000:1000:Karan,,,:/home/wolf:/bin/bash'), and a final prompt 'wolf@Karan:~\$'.

Ques. 9 - Write a shell script to display all files in the /home/YourLoginName subdirectory as well as display the type of all files.

Ans. 9 -

Script:



```
#!/bin/bash
ls -l
file
```

Output:

```
wolf@Karan: ~$ ./Ques9.sh
total 72
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Desktop
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:38 Documents
drwxr-xr-x 2 wolf wolf 4096 Aug 30 09:20 Downloads
drwxrwxr-x 4 wolf wolf 4096 Aug 17 19:21 GitHub
drwxrwxr-x 2 wolf wolf 4096 Jul 28 08:45 Music
drwxrwxr-x 2 wolf wolf 4096 Aug 10 20:30 'Phone Transfer'
drwxr-xr-x 5 wolf wolf 4096 Aug 30 09:27 Pictures
-rwxr-xr-x 1 wolf wolf 198 Aug 30 09:44 Ques2.sh
-rwxr-xr-x 1 wolf wolf 145 Aug 30 09:53 Ques3.sh
-rwxr-xr-x 1 wolf wolf 233 Aug 30 09:57 Ques4.sh
-rwxr-xr-x 1 wolf wolf 258 Aug 30 10:06 Ques5.sh
-rwxr-xr-x 1 wolf wolf 391 Aug 30 10:13 Ques6.sh
-rwxr-xr-x 1 wolf wolf 129 Aug 30 10:18 Ques7.sh
-rwxr-xr-x 1 wolf wolf 39 Aug 30 10:22 Ques8.sh
-rwxr-xr-x 1 wolf wolf 26 Aug 30 10:33 Ques9.sh
drwxr-xr-x 8 wolf wolf 4096 Aug 8 00:11 snap
drwxrwxr-x 2 wolf wolf 4096 Aug 18 16:09 sndcpy
drwxrwxr-x 2 wolf wolf 4096 Aug 10 19:05 Videos
Desktop:      directory
Documents:    directory
Downloads:    directory
GitHub:       directory
Music:        directory
Phone Transfer: directory
Pictures:     directory
Ques2.sh:     Bourne-Again shell script, ASCII text executable
Ques3.sh:     Bourne-Again shell script, ASCII text executable
Ques4.sh:     Bourne-Again shell script, ASCII text executable
Ques5.sh:     Bourne-Again shell script, ASCII text executable
Ques6.sh:     Bourne-Again shell script, ASCII text executable
Ques7.sh:     Bourne-Again shell script, ASCII text executable
Ques8.sh:     Bourne-Again shell script, ASCII text executable
Ques9.sh:     Bourne-Again shell script, ASCII text executable
snap:         directory
sndcpy:       directory
Videos:       directory
wolf@Karan: ~$
```

Ques. 10 - Using shell script, display the contents of the present working directory. If it is an ordinary file print its permission and change the permissions to r--r--r-- .

Ans. 10 -

Script:

Output:

```
wolf@Karan: ~  
wolf@Karan:~$ vi Ques11.sh  
wolf@Karan:~$ chmod 755 Ques11.sh  
wolf@Karan:~$ ./Ques11.sh  
grep: /home/wolf/snap/spotify/41/.pki/nssdb/pkcs11.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/jedi/third_party/django-stubs/LICENSE.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/debugpy/_vendored/pydevd/pydevd_sitecustomt  
ze/___not_in_default_pythonpath.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/debugpy/_vendored/pydevd/pydevd_attach_to_  
process/README.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/debugpy/ThirdPartyNotices.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar39.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar34.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar37.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar35.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar27.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar38.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar36.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/pythonFiles/lib/python/parso/python/grammar33.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/out/datascience-ui/notebook/node_modules/font-awesome/HELP-US-OUT  
.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/LICENSE.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/ThirdPartyNotices-Repository.txt  
/home/wolf/.vscode/extensions/ms-python.python-2020.8.105045/ThirdPartyNotices-Distribution.txt  
/home/wolf/.ssr/logs/log-2020-08-07_17.24.13.txt  
/home/wolf/.local/share/albert/org.albert.extension.python/modules/emoji.txt  
/home/wolf/.local/share/gnome-shell/extensions/animation-tweaks@Selenium-H/effectParameters.txt  
/home/wolf/.cache/clipboard-indicator@tudmotu.com/registry.txt  
/home/wolf/.cache/tracker/locale-for-miner-apps.txt  
/home/wolf/.cache/tracker/parser-version.txt  
/home/wolf/.cache/tracker/db-version.txt  
/home/wolf/.cache/tracker/db-locale.txt  
/home/wolf/.cache/tracker/last-crawl.txt  
/home/wolf/.cache/tracker/first-index.txt  
/home/wolf/.pki/nssdb/pkcs11.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/TRRBlacklist.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/enumerate_devices.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/SiteSecurityServiceState.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/serviceworker.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1596385101102.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1596385138247.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1595538941158.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1595651695913.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1595906289271.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/weave/logs/error-sync-1595801995765.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/gmp-widevinecdm/4.10.1582.2/LICENSE.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/SecurityPreloadState.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/AlternateServices.txt  
/home/wolf/.mozilla/firefox/cldu540v.default-release/pkcs11.txt  
/home/wolf/Test.txt  
/home/wolf/.thunderbird/nel75p7o.default-release/SiteSecurityServiceState.txt  
/home/wolf/.thunderbird/nel75p7o.default-release/SecurityPreloadState.txt  
/home/wolf/.thunderbird/nel75p7o.default-release/AlternateServices.txt  
/home/wolf/.thunderbird/nel75p7o.default-release/revocations.txt
```

Ques. 12 - Write a C program to kill a process by specifying its name rather than its PID.

Ans. 12 -

C Code:

```
wolf@Karan: ~  
#include <sys/types.h>  
#include <unistd.h>  
#include <stdio.h>  
#include <signal.h>  
#include <stdlib.h>  
  
int main(int argc , char *argv[])  
{  
    system("pkill -f autoadb");  
    printf("autoadb process killed");  
    system("ps -A");  
    return 0;  
}  
~  
~  
~  
~  
~  
~  
~  
~  
"Ques12.c" 13L, 234C 1,1 All
```

Output:

```
wolf@Karan: ~  
wolf@Karan:~$ gcc Ques12.c  
wolf@Karan:~$ ./a.out  
PID TTY TIME CMD  
1 ? 00:00:11 systemd  
2 ? 00:00:00 kthreadd  
3 ? 00:00:00 rcu_gp  
4 ? 00:00:00 rcu_par_gp  
6 ? 00:00:00 kworker/0:0H-kblockd  
9 ? 00:00:00 mm_percpu_wq  
10 ? 00:00:00 ksoftirqd/0  
11 ? 00:00:06 rcu_sched  
12 ? 00:00:00 migration/0  
13 ? 00:00:00 idle_inject/0  
14 ? 00:00:00 cpuhp/0  
15 ? 00:00:00 cpuhp/1  
16 ? 00:00:00 idle_inject/1  
17 ? 00:00:00 migration/1  
18 ? 00:00:00 ksoftirqd/1  
20 ? 00:00:00 kworker/1:0H-kblockd  
21 ? 00:00:00 cpuhp/2  
22 ? 00:00:00 idle_inject/2  
23 ? 00:00:00 migration/2  
24 ? 00:00:00 ksoftirqd/2  
26 ? 00:00:00 kworker/2:0H-kblockd  
27 ? 00:00:00 cpuhp/3  
28 ? 00:00:00 idle_inject/3  
29 ? 00:00:00 migration/3  
30 ? 00:00:00 ksoftirqd/3  
32 ? 00:00:00 kworker/3:0H-kblockd  
33 ? 00:00:00 cpuhp/4  
34 ? 00:00:00 idle_inject/4  
35 ? 00:00:00 migration/4  
36 ? 00:00:00 ksoftirqd/4  
38 ? 00:00:00 kworker/4:0H-kblockd  
39 ? 00:00:00 cpuhp/5  
40 ? 00:00:00 idle_inject/5  
41 ? 00:00:00 migration/5
```



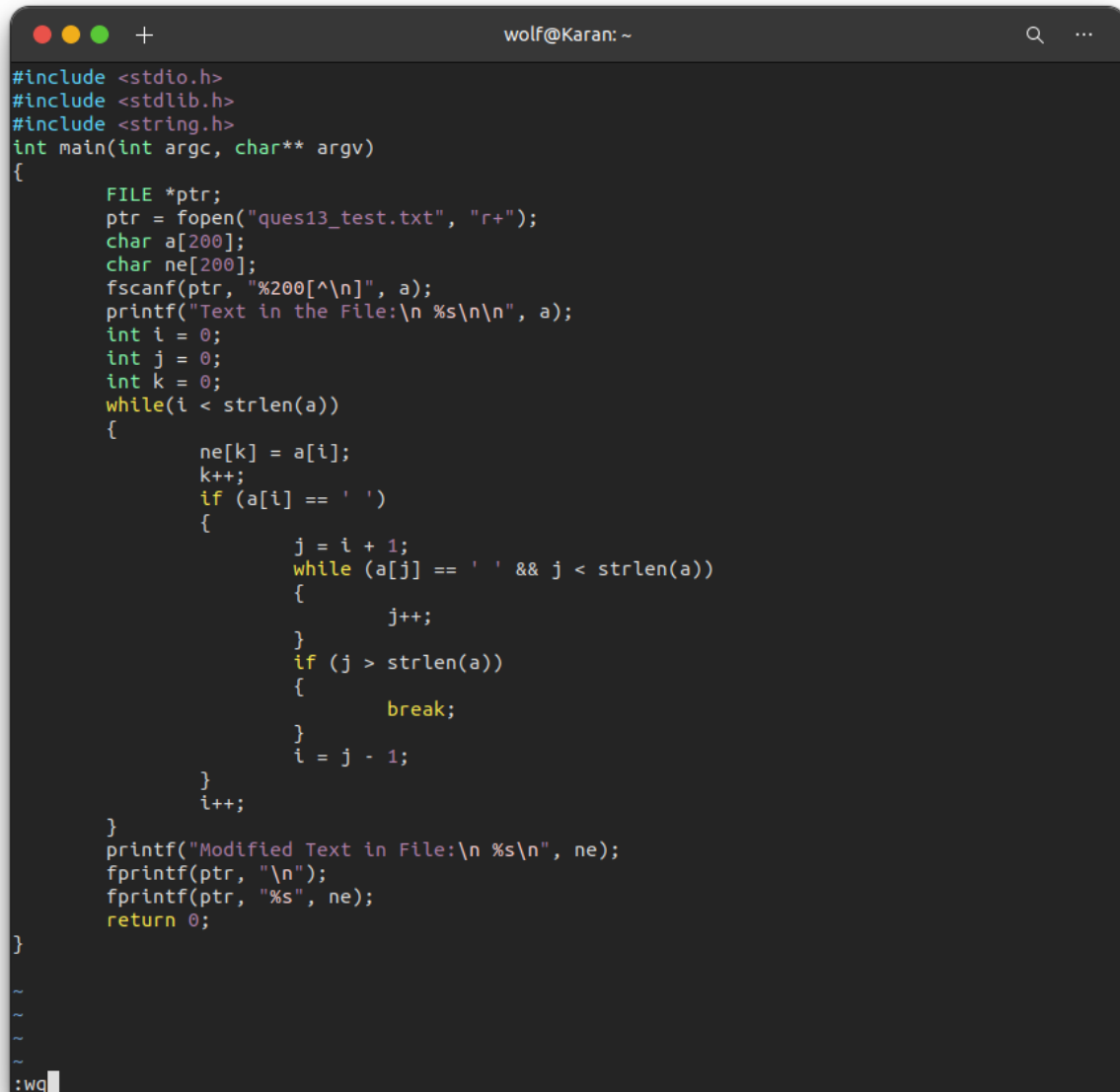
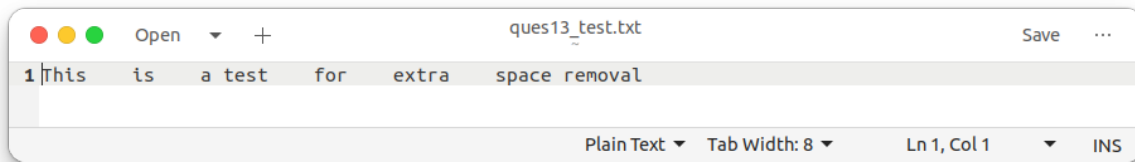
```
wolf@Karan: ~  
19643 ? 00:00:09 chrome  
19851 ? 00:00:01 chrome  
19874 ? 00:00:29 chrome  
19887 ? 00:00:06 chrome  
19912 ? 00:00:20 chrome  
20007 ? 00:00:01 kworker/5:0-events  
20076 ? 00:00:43 chrome  
20108 ? 00:00:00 kworker/2:2-mm_percpu_wq  
20113 ? 00:00:02 chrome  
20128 ? 00:00:00 kworker/4:1-memcg_kmem_cache  
20140 ? 00:00:01 chrome  
20170 ? 00:00:01 chrome  
20221 ? 00:00:03 chrome  
20250 ? 00:00:00 kworker/7:1-events  
20267 ? 00:00:00 chrome  
20274 ? 00:00:00 kworker/6:0-events  
20279 ? 00:00:01 chrome  
20293 ? 00:00:01 chrome  
20317 ? 00:00:00 chrome  
20338 ? 00:00:00 kworker/u16:3-events_unbound  
20651 ? 00:00:00 kworker/1:0-events  
20678 ? 00:00:01 chrome  
20700 ? 00:00:00 chrome  
20732 ? 00:00:00 kworker/0:0-events  
20883 ? 00:00:09 chrome  
20918 ? 00:00:00 chrome  
20923 ? 00:00:00 chrome  
20982 ? 00:00:00 chrome  
21172 ? 00:00:00 tracker-store  
21292 ? 00:00:00 systemd-hostnam  
21293 ? 00:00:00 kworker/3:0-events  
21296 ? 00:00:00 kworker/4:2-events  
21348 ? 00:00:00 kworker/0:3-events  
21365 pts/0 00:00:00 a.out  
21368 pts/0 00:00:00 sh  
21369 pts/0 00:00:00 ps  
autoadb process killed wolf@Karan:~$
```

Ques. 13 - Create a file with few lines. Write a C program to read the file and delete the spaces more than one in the file (use UNIX file API's).

Ans. 13 -

C Code:

Text File -



Output:

```
wolf@Karan: ~  
wolf@Karan:~$ touch ques13_test.txt  
wolf@Karan:~$ echo "This is a test for extra space removal" > ques13_test.txt  
wolf@Karan:~$ vi Ques13.c  
wolf@Karan:~$ gcc Ques13.c  
wolf@Karan:~$ ./a.out  
Text in the File:  
This is a test for extra space removal  
  
Modified Text in File:  
This is a test for extra space removal  
wolf@Karan:~$
```

Ques. 14 - Write a program

- a. To create parent & child process and print their id

C Code:

```
wolf@Karan: ~  
#include <stdio.h>  
#include <unistd.h>  
#include <sys/types.h>  
int main(int argc, char **argv)  
{  
    int pid;  
    pid=fork();  
    if(pid<0)  
    {  
        printf("\nNot Exexutable");  
    }  
    else if (pid==0)  
    {  
        printf("Child process is %d\n", getpid());  
        printf("Parent of child process is %d\n", getppid());  
    }  
    else  
    {  
        printf("Parent process is %d\n", getpid());  
        printf("Parent id of parent process is %d\n", getppid());  
    }  
    return 0;  
}  
"Ques14.c" 23L, 422C 1,1 All
```

Output:

```
wolf@Karan:~$ vi Ques14.c
wolf@Karan:~$ gcc Ques14.c -o Ques14
wolf@Karan:~$ ./Ques14
Parent process is 22463
Parent id of parent process is 21516
Child process is 22464
Parent of child process is 22463
wolf@Karan:~$
```

b. To create a zombie process.

C Code:

```

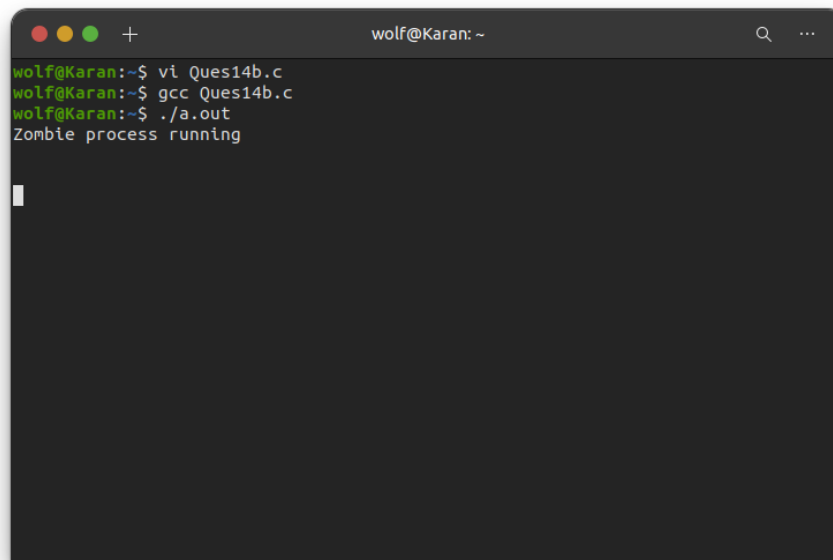
#include<stdlib.h>
#include<sys/types.h>
#include<unistd.h>
#include<stdio.h>
int main ()
{
    printf("Zombie process running");
    pid_t pid = fork();

    if (pid > 0) //implies parent process
        sleep(50);

    else // implies child process
        exit(0);
    return 0;
}
~
~
~
~
~
~
"Ques14b.c" 16L, 257C 1,1 All

```

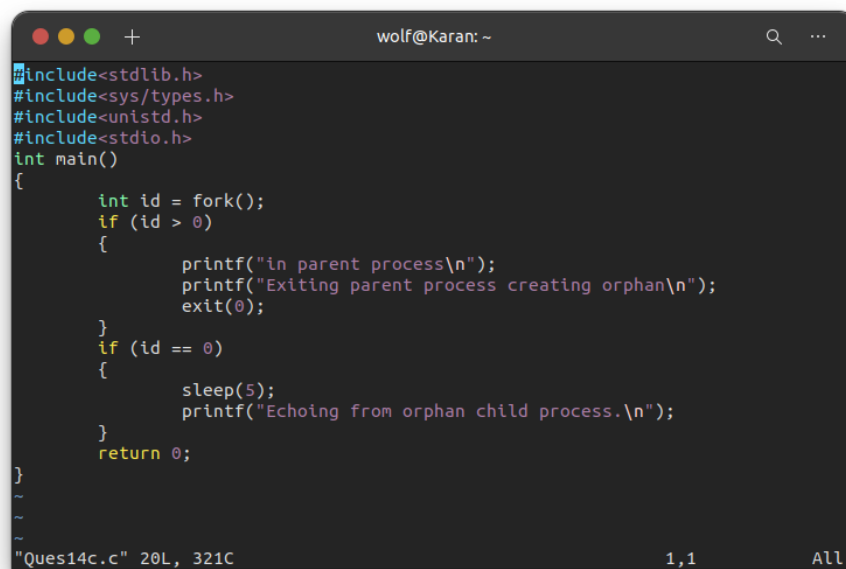
Output:



```
wolf@Karan: ~  
wolf@Karan:~$ vi Ques14b.c  
wolf@Karan:~$ gcc Ques14b.c  
wolf@Karan:~$ ./a.out  
Zombie process running
```

c. To create an orphan process.

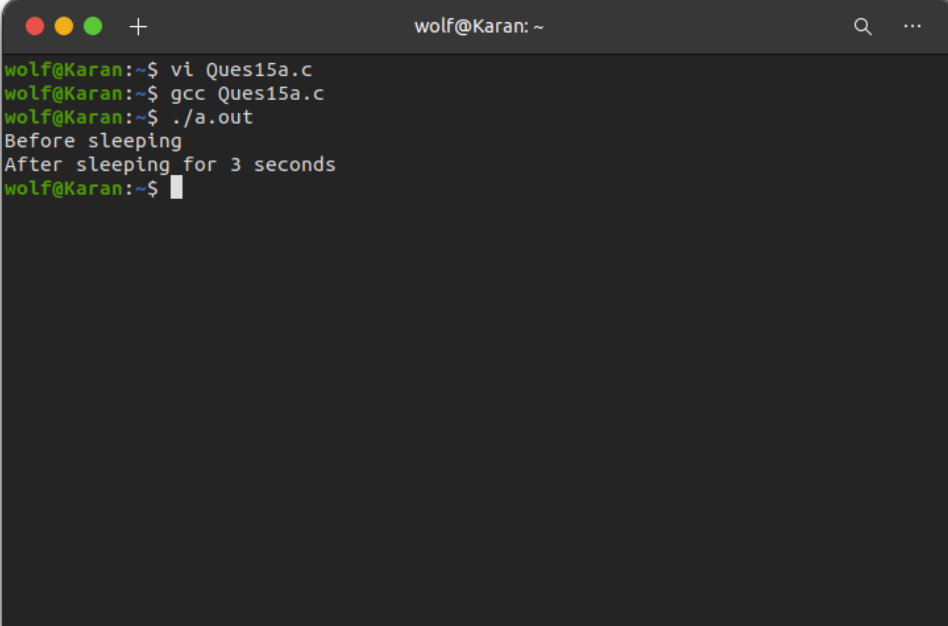
C Code:



```
#include<stdlib.h>  
#include<sys/types.h>  
#include<unistd.h>  
#include<stdio.h>  
int main()  
{  
    int id = fork();  
    if (id > 0)  
    {  
        printf("in parent process\n");  
        printf("Exiting parent process creating orphan\n");  
        exit(0);  
    }  
    if (id == 0)  
    {  
        sleep(5);  
        printf("Echoing from orphan child process.\n");  
    }  
    return 0;  
}  
~  
~  
~  
"Ques14c.c" 20L, 321C 1,1 All
```

Output:

Output:

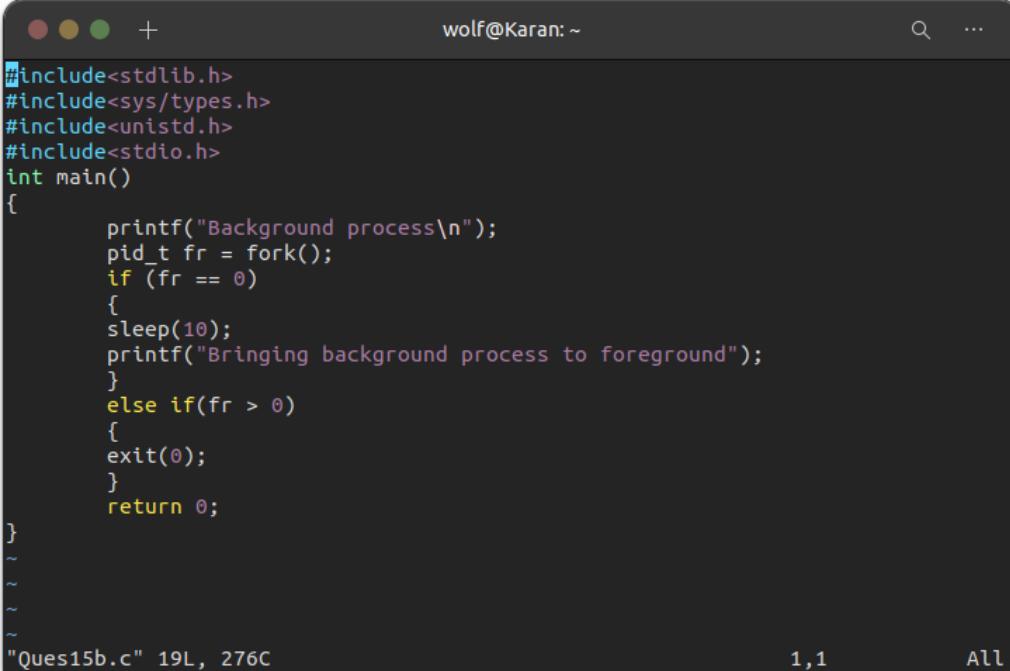


```
wolf@Karan: ~$ vi Ques15a.c
wolf@Karan: ~$ gcc Ques15a.c
wolf@Karan: ~$ ./a.out
Before sleeping
After sleeping for 3 seconds
wolf@Karan: ~$
```

A terminal window with a dark background. The title bar shows 'wolf@Karan: ~'. The command history shows the user editing 'Ques15a.c', compiling it with 'gcc', and running it with './a.out'. The program's output is 'Before sleeping' followed by 'After sleeping for 3 seconds' after a pause. The prompt returns to 'wolf@Karan: ~\$'.

b. To create a background process.

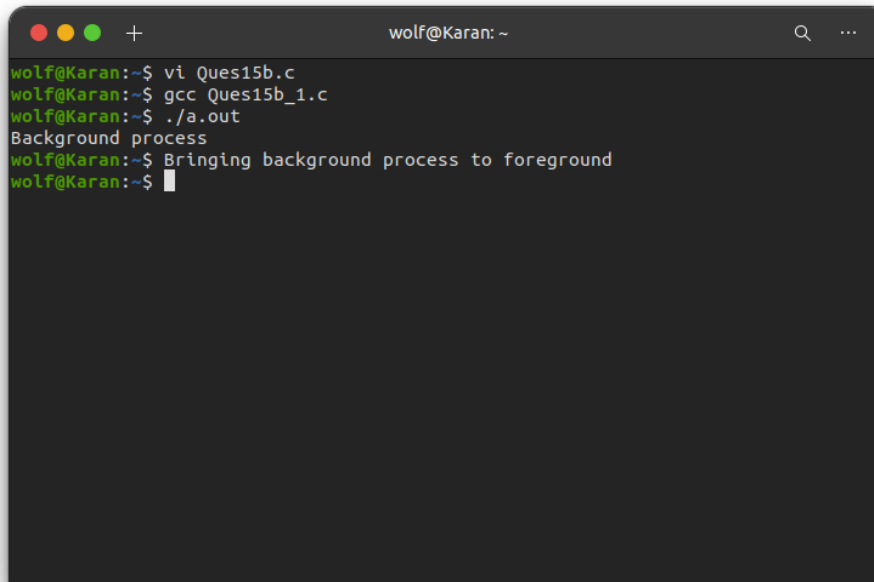
C Code:



```
#include<stdlib.h>
#include<sys/types.h>
#include<unistd.h>
#include<stdio.h>
int main()
{
    printf("Background process\n");
    pid_t fr = fork();
    if (fr == 0)
    {
        sleep(10);
        printf("Bringing background process to foreground");
    }
    else if(fr > 0)
    {
        exit(0);
    }
    return 0;
}
~
~
~
~
"Ques15b.c" 19L, 276C 1,1 All
```

A terminal window with a dark background. The title bar shows 'wolf@Karan: ~'. The code is displayed in a monospaced font with syntax highlighting: preprocessor directives are blue, keywords are green, and identifiers are white. The code creates a child process that sleeps for 10 seconds and then prints a message. The parent process exits immediately. The status bar at the bottom shows the filename 'Ques15b.c', line 19, column 276, and other details.

Output:

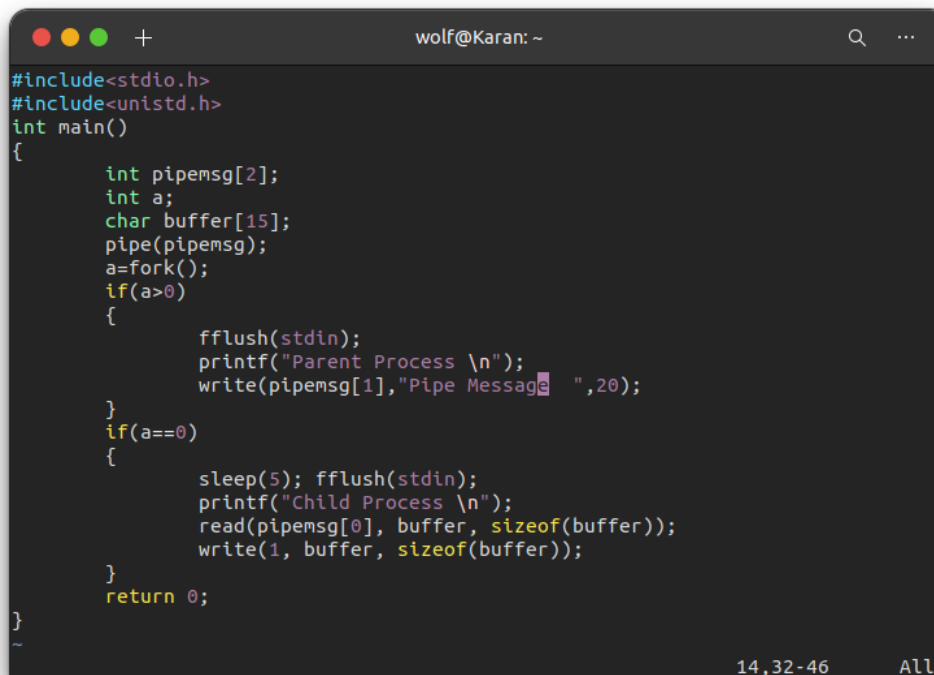


```
wolf@Karan: ~  
wolf@Karan:~$ vi Ques15b.c  
wolf@Karan:~$ gcc Ques15b_1.c  
wolf@Karan:~$ ./a.out  
Background process  
wolf@Karan:~$ Bringing background process to foreground  
wolf@Karan:~$
```

Ques. 16 - Implement the program to pass messages using pipes.

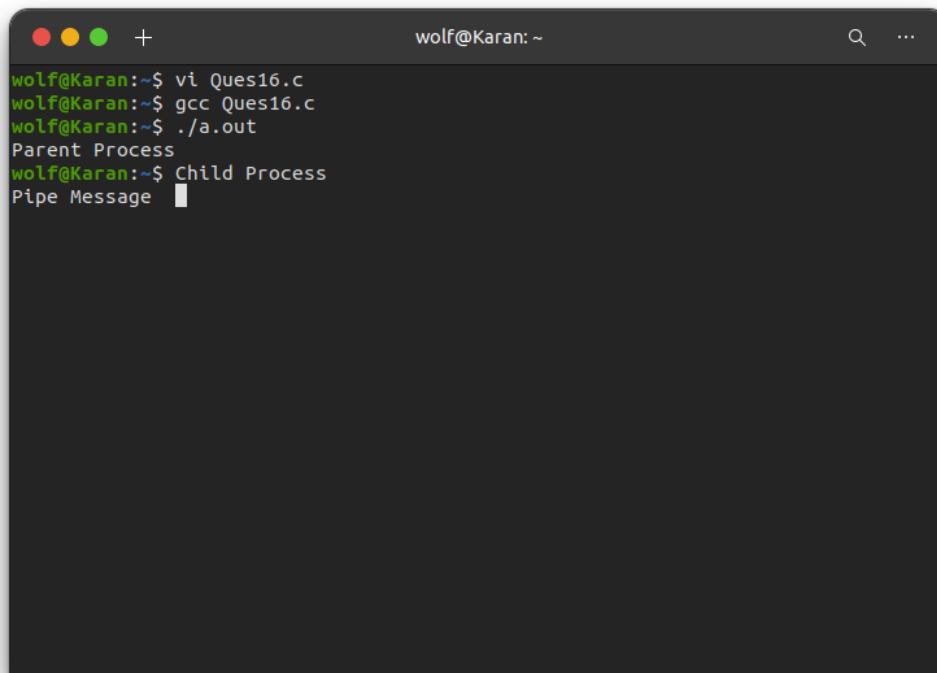
Ans. 16 -

C Code:



```
#include<stdio.h>  
#include<unistd.h>  
int main()  
{  
    int pipemsg[2];  
    int a;  
    char buffer[15];  
    pipe(pipemsg);  
    a=fork();  
    if(a>0)  
    {  
        fflush(stdin);  
        printf("Parent Process \n");  
        write(pipemsg[1],"Pipe Message ",20);  
    }  
    if(a==0)  
    {  
        sleep(5); fflush(stdin);  
        printf("Child Process \n");  
        read(pipemsg[0], buffer, sizeof(buffer));  
        write(1, buffer, sizeof(buffer));  
    }  
    return 0;  
}
```


Output:



```
wolf@Karan:~$ vi Ques16.c
wolf@Karan:~$ gcc Ques16.c
wolf@Karan:~$ ./a.out
Parent Process
wolf@Karan:~$ Child Process
Pipe Message
```

Ques. 17 - Write a program to demonstrate the implementation of Inter Process Communication (IPC) using shared memory.

Ans. 17 -

C Code:

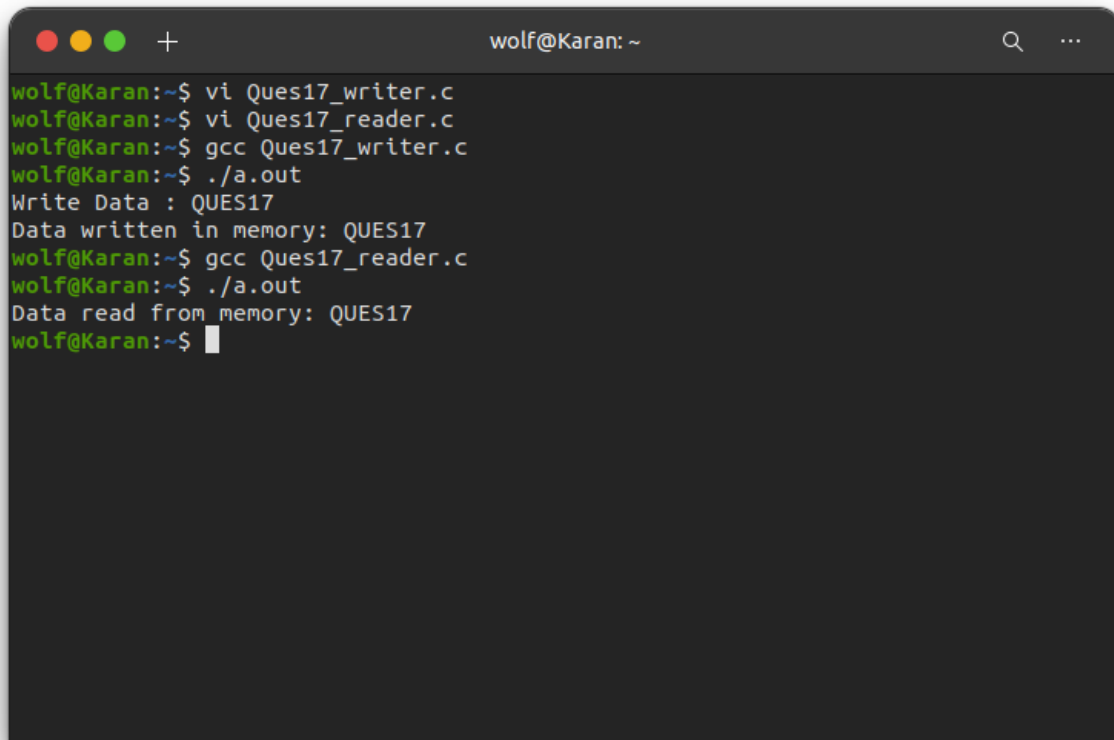
- Writing to Shared Memory -

```
wolf@Karan: ~  
#include <sys/ipc.h>  
#include <sys/shm.h>  
#include <stdio.h>  
  
int main()  
{  
    key_t key = ftok("shmfile",65);  
    int shmida = shmget(key,1024,0666|IPC_CREAT);  
    char *str = (char*) shmat(shmida,(void*)0,0);  
  
    printf("Write Data : ");  
    scanf("%s", str);  
  
    printf("Data written in memory: %s\n",str);  
  
    shmdt(str);  
    return 0;  
}  
  
~  
~  
~  
~  
~  
-- INSERT -- 17,1 All
```

- Reading from shared memory -

```
wolf@Karan: ~  
#include <sys/ipc.h>  
#include <sys/shm.h>  
#include <stdio.h>  
  
int main()  
{  
    key_t key = ftok("shmfile",65);  
    int shmida = shmget(key,1024,0666|IPC_CREAT);  
  
    char *str = (char*) shmat(shmida,(void*)0,0);  
  
    printf("Data read from memory: %s\n",str);  
  
    shmdt(str);  
    shmctl(shmida,IPC_RMID,NULL);  
  
    return 0;  
}  
  
~  
~  
~  
:wq
```

Output:

A terminal window titled 'wolf@Karan: ~' with standard macOS window controls (red, yellow, green buttons and a plus sign). The terminal shows the following commands and output:

```
wolf@Karan:~$ vi Ques17_writer.c
wolf@Karan:~$ vi Ques17_reader.c
wolf@Karan:~$ gcc Ques17_writer.c
wolf@Karan:~$ ./a.out
Write Data : QUES17
Data written in memory: QUES17
wolf@Karan:~$ gcc Ques17_reader.c
wolf@Karan:~$ ./a.out
Data read from memory: QUES17
wolf@Karan:~$
```

Ques. 18 - Write a program to create a thread and let the thread check whether the given number is prime or not.

Ans. 18 -

C Code:

```
wolf@Karan: ~  
#include<unistd.h>  
#include<string.h>  
#include<sys/types.h>  
#include<sys/ipc.h>  
#include<sys/shm.h>  
#include<stdio.h>  
#include<stdlib.h>  
#include<pthread.h>  
void *primechecker(void *arg)  
{  
    int num = *((int*)arg);  
    printf("In Created Thread Function\n");  
    int i=2; int flag = 0;  
    for(i=2;i<num;i++)  
    {  
        if(num%i==0)  
        {  
            printf("Number is Not Prime (printed from Thread)\n\n");  
            flag = 1;  
            break;  
        }  
    }  
    if( flag == 0)  
    {  
        printf("Number is Prime (printed from Thread)\n\n");  
    }  
    return NULL;  
}  
int main()  
{  
    int number;  
    printf("Enter the number: \n");  
    scanf("%d",&number);  
    int *point = &number;  
    pthread_t thread_id;  
    printf("Before Creating Thread\n");  
    pthread_create(&thread_id, NULL, primechecker,point);  
    pthread_exit( NULL);  
    printf("After Creating Thread\n");  
    exit(0);  
}  
~  
"Ques18.c" 41L, 793C 40,9-16 All
```

Output:

```
wolf@Karan: ~  
wolf@Karan:~$ vi Ques18.c  
wolf@Karan:~$ gcc -pthread Ques18.c  
wolf@Karan:~$ ./a.out  
Enter the number:  
13  
Before Creating Thread  
  
In Created Thread Function  
  
Number is Prime (printed from Thread)  
  
wolf@Karan:~$ ./a.out  
Enter the number:  
4  
Before Creating Thread  
  
In Created Thread Function  
  
Number is Not Prime (printed from Thread)  
  
wolf@Karan:~$
```