TERM PROJECT
CS630002-Operating Systems Design

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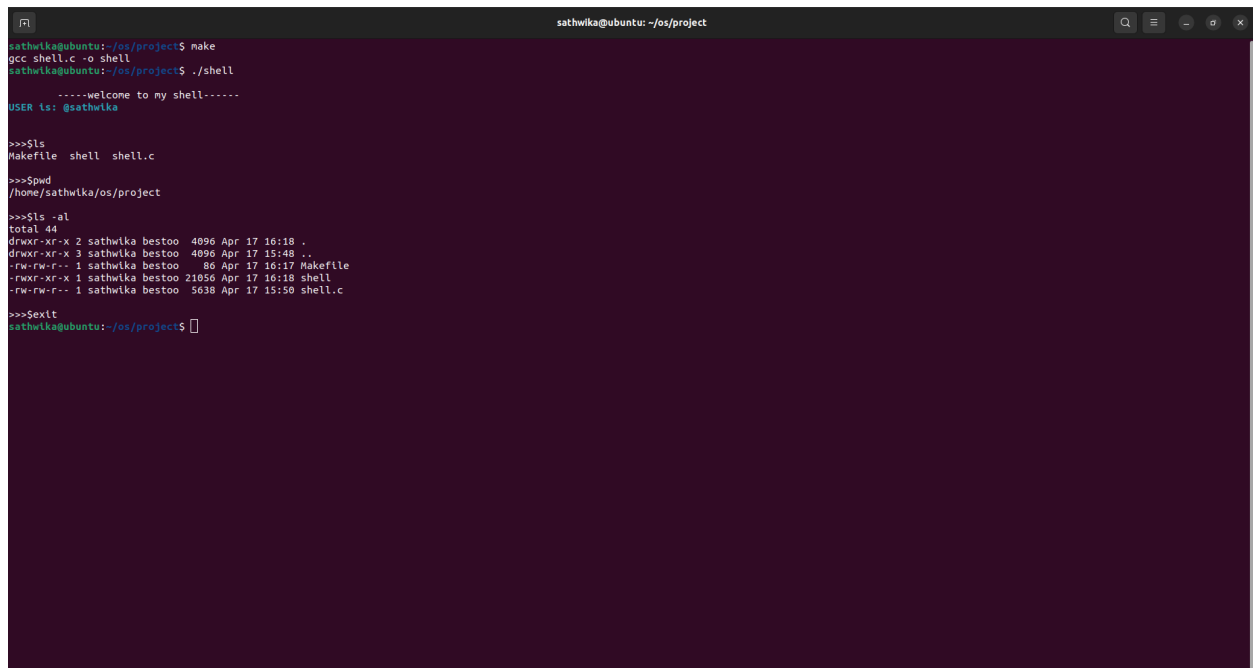**#compile**

make

#run

./shell

Description:

This project consists of designing a C program to serve as a shell interface that accepts user commands and then executes each command in a separate process. A shell interface gives the user a prompt, after which the next command is entered.

Below mentioned features are implemented in the program.

1. Exit command: program exits on entering 'exit' command

2. Running in background: child process runs in background on adding '&'

```
sathwika@ubuntu:~/os/project$ make
make: 'shell' is up to date.
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$ls
Makefile  shell  shell.c  test.c

>>>$pwd
/home/sathwika/os/project

>>>$gedit test.c &
[1]3687

>>>$cat test.c &
[1]3714

>>>$#include<stdio.h>
{
int main()
printf("hello world!!");
return 0;
}
```

3. History feature:
case:1: shows recently entered 10 commands


```
make: 'shell' is up to date.
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$ls
Makefile  shell  shell.c  test.c

>>>$pwd
/home/sathwika/os/project

>>>$gedit test.c &
[1]3687

>>>$cat test.c &
[1]3714

>>>$#include<stdio.h>
{
int main()
printf("hello world!!");
return 0;
}


>>>$whoami
sathwika

>>>$ls -l
total 40
-rw-rw-r-- 1 sathwika bestoo    86 Apr 17 16:17 Makefile
-rwxr-xr-x 1 sathwika bestoo 21056 Apr 17 16:18 shell
-rw-rw-r-- 1 sathwika bestoo  5638 Apr 17 15:50 shell.c
-rw-r--r-- 1 sathwika bestoo    68 Apr 17 16:20 test.c

>>>$ps -al
F S   UID     PID    PPID  C PRI  NI ADDR SZ WCHAN  TTY        TIME CMD
0 S  1000    1762    1757  0  80   0 - 57921 do_pol tty2    00:00:00 gnome-session-b
0 S  1000    3684    3666  0  80   0 -   694 do_wai pts/0   00:00:00 shell
0 S  1000    3687    3684  1  80   0 - 161161 do_pol pts/0  00:00:00 gedit
0 R  1000    3778    3684  0  80   0 -  5331 -      pts/0    00:00:00 ps

>>>$ps
   PID TTY          TIME CMD
  3666 pts/0    00:00:00 bash
  3684 pts/0    00:00:00 shell
  3687 pts/0    00:00:00 gedit
  3786 pts/0    00:00:00 ps

>>>$echo "hello"
```

```
[1]3687

>>>$cat test.c &
[1]3714

>>>$#include<stdio.h>
{
int main()
printf("hello world!!");
return 0;
}


>>>$whoami
sathwika

>>>$ls -l
total 40
-rw-rw-r-- 1 sathwika bestoo    86 Apr 17 16:17 Makefile
-rwxr-xr-x 1 sathwika bestoo 21056 Apr 17 16:18 shell
-rw-rw-r-- 1 sathwika bestoo  5638 Apr 17 15:50 shell.c
-rw-r--r-- 1 sathwika bestoo    68 Apr 17 16:20 test.c

>>>$ps -al
F S   UID    PID   PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 S  1000   1762   1757  0  80   0 - 57921 do_pol tty2     00:00:00 gnome-session-b
0 S  1000   3684   3666  0  80   0 -   694 do_wai pts/0    00:00:00 shell
0 S  1000   3687   3684  1  80   0 - 161161 do_pol pts/0   00:00:00 gedit
0 R  1000   3778   3684  0  80   0 -  5331 -      pts/0    00:00:00 ps

>>>$ps
   PID TTY          TIME CMD
  3666 pts/0    00:00:00 bash
  3684 pts/0    00:00:00 shell
  3687 pts/0    00:00:00 gedit
  3786 pts/0    00:00:00 ps

>>>$echo "hello"
"hello"

>>>$history
[1] ls
[2] pwd
[3] gedit test.c &
[4] cat test.c &
[5] whoami
[6] ls -l
[7] ps -al
[8] ps
[9] echo "hello"

>>>$
```

case 2: history_count > 10

```
>>>$history
[4] cat test.c &
[5] whoami
[6] ls -l
[7] ps -al
[8] ps
[9] echo "hello"
[10] gcc --v
[11] gcc which
[12] which gcc
[13] clear

>>>$
```

4. Recent command entered: executes recent command on '!!'


```
>>>$history
[4] cat test.c &
[5] whoami
[6] ls -l
[7] ps -al
[8] ps
[9] echo "hello"
[10] gcc --v
[11] gcc which
[12] which gcc
[13] clear

>>>$pwd
/home/sathwika/os/project

>>>$!!
/home/sathwika/os/project

>>>$
```

5. Executing Nth command in history: on entering '!N', where 'N' is the history index


```
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$pwd
/home/sathwika/os/project

>>>$whoami
sathwika

>>>$ls
Makefile  shell  shell.c  test.c

>>>$ps -l
F S   UID     PID    PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 S  1000    3666    3648  0  80   0 -  4948 do_wai pts/0    00:00:00 bash
0 S  1000    3687    1686  0  80   0 - 161246 do_pol pts/0   00:00:01 gedit
0 S  1000    4043    3666  0  80   0 -   694 do_wai pts/0    00:00:00 shell
0 R  1000    4047    4043  0  80   0 -  5331 -      pts/0    00:00:00 ps

>>>$ls -al
total 48
drwxr-xr-x 2 sathwika bestoo  4096 Apr 17 16:29 .
drwxr-xr-x 3 sathwika bestoo  4096 Apr 17 15:48 ..
-rw-rw-r-- 1 sathwika bestoo    86 Apr 17 16:17 Makefile
-rwxr-xr-x 1 sathwika bestoo 21056 Apr 17 16:18 shell
-rw-rw-r-- 1 sathwika bestoo  5638 Apr 17 15:50 shell.c
-rw-r--r-- 1 sathwika bestoo    68 Apr 17 16:20 test.c

>>>$!2
sathwika

>>>$!1
/home/sathwika/os/project
```

6. Error on entering invalid command in command line

```
sathwika@ubuntu:~/os/project$ make
make: 'shell' is up to date.
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$gcc test.c

>>>$./a.out
hello world!!
>>>$mdir
INVALID COMMAND

>>>$
```

7. Error on entering '!!' as the first command (when there is no command in history)


```
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$!!
NO COMMANDS IN HISTORY
INVALID COMMAND

>>>$
```

8. Error on entering '!N' when Nth index is greater than 10


```
sathwika@ubuntu:~/os/project$ ./shell

        -----welcome to my shell------
USER is: @sathwika


>>>$pwd
/home/sathwika/os/project

>>>$ls
Makefile   shell   shell.c   test.c

>>>$whoami
sathwika

>>>$!11
NO SUCH COMMAND IN HISTORY(index out of range)
```