

## Assignment 2

### CS-370 (Operating Systems)

Roll No:22100337

## Project 1 —UNIX Shell:

### Part II:

[screenshot]

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ls -l
total 96
-rw-r--r-- 1 oscreader oscreader  0 Oct 27 05:12 cat
-rw-r--r-- 1 oscreader oscreader 710 Jan  3 2018 DateClient.java
-rw-r--r-- 1 oscreader oscreader 810 Jun 18 2018 DateServer.java
-rw-r--r-- 1 oscreader oscreader 361 Jun 18 2018 fig3-30.c
-rw-r--r-- 1 oscreader oscreader 121 Jan  3 2018 fig3-31.c
-rw-r--r-- 1 oscreader oscreader 136 Jan  3 2018 fig3-32.c
-rw-r--r-- 1 oscreader oscreader 500 Jun 18 2018 fig3-33.c
-rw-r--r-- 1 oscreader oscreader 680 Jun 18 2018 fig3-34.c
-rw-r--r-- 1 oscreader oscreader 534 Jun 18 2018 fig3-35.c
-rwxr-xr-x 1 oscreader oscreader 8712 Jan 30 2018 multi-fork
-rw-r--r-- 1 oscreader oscreader 257 Jan 30 2018 multi-fork.c
-rw-r--r-- 1 oscreader oscreader 780 Jan 28 2018 newproc-posix.c
-rw-r--r-- 1 oscreader oscreader 1413 Jan  3 2018 newproc-win32.c
-rw-r--r-- 1 oscreader oscreader 2976 Jun 18 2018 pid.c
-rw-r--r-- 1 oscreader oscreader 1115 Jun 18 2018 shm-posix-consumer.c
-rw-r--r-- 1 oscreader oscreader 1434 Jun 18 2018 shm-posix-producer.c
-rwxr-xr-x 1 oscreader oscreader 8140 Oct 29 09:32 simple-shell
-rw-r--r-- 1 oscreader oscreader 6302 Oct 29 11:01 simple-shell.c
-rw-r--r-- 1 oscreader oscreader 1219 Jan  3 2018 unix_pipe.c
-rw-r--r-- 1 oscreader oscreader 755 Jan  3 2018 win32-pipe-child.c
-rw-r--r-- 1 oscreader oscreader 2236 Jan  3 2018 win32-pipe-parent.c
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$
```

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
-rw-r--r-- 1 oscreader oscreader 1413 Jan  3 2018 newproc-win32.c
-rw-r--r-- 1 oscreader oscreader 2976 Jun 18 2018 pid.c
-rw-r--r-- 1 oscreader oscreader 1115 Jun 18 2018 shm-posix-consumer.c
-rw-r--r-- 1 oscreader oscreader 1434 Jun 18 2018 shm-posix-producer.c
-rwxr-xr-x 1 oscreader oscreader 8140 Oct 29 09:32 simple-shell
-rw-r--r-- 1 oscreader oscreader 6302 Oct 29 11:01 simple-shell.c
-rw-r--r-- 1 oscreader oscreader 1219 Jan  3 2018 unix_pipe.c
-rw-r--r-- 1 oscreader oscreader 755 Jan  3 2018 win32-pipe-child.c
-rw-r--r-- 1 oscreader oscreader 2236 Jan  3 2018 win32-pipe-parent.c
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ls &
[1] 1508
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ cat          fig3-33.c
newproc-win32.c      unix_pipe.c
DateClient.java     fig3-34.c           pid.c              win32-pipe-child.c
DateServer.java     fig3-35.c           shm-posix-consumer.c win32-pipe-parent.c
fig3-30.c            multi-fork          shm-posix-producer.c
fig3-31.c            multi-fork.c        simple-shell
fig3-32.c            newproc-posix.c     simple-shell.c
ps
  PID TTY          TIME CMD
 1500 pts/0    00:00:00 bash
 1509 pts/0    00:00:00 ps
[1]+  Done                  ls --color=auto
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$
win32-pipe-parent.c
newproc-posix.c
shm-posix-producer.c
win32-pipe-child.c
fig3-30.c
fig3-34.c
fig3-35.c
fig3-31.c
fig3-32.c
fig3-33.c
multi-fork.c
multi-fork
simple-shell
simple-shell.c
unix_pipe.c
win32-pipe-child.c
win32-pipe-parent.c
```

### Part III:

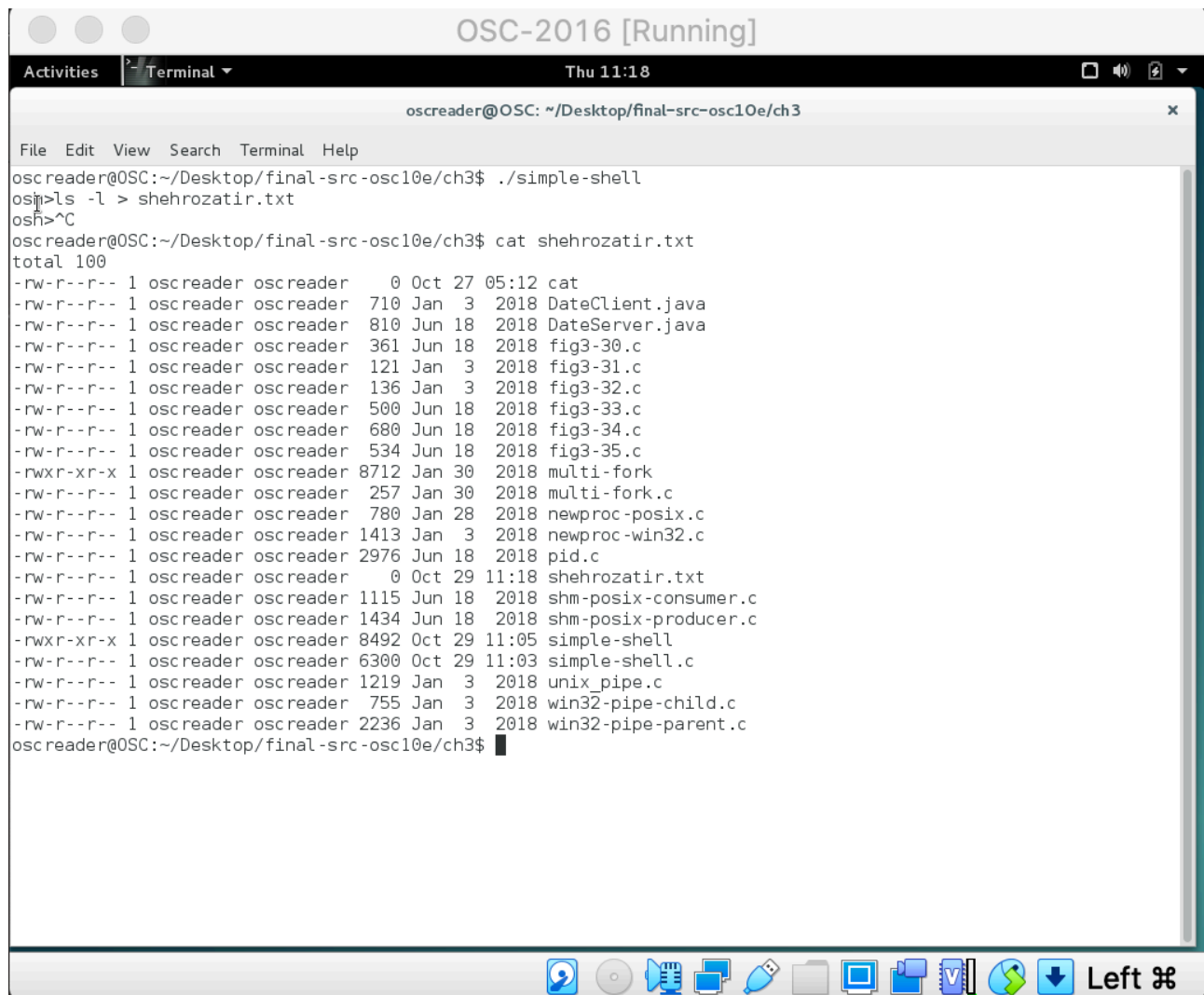
[screenshot]

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ gcc -o simple-shell simple-shell.c
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ./simple-shell
osh>!!
Error: History empty.
osh>
```

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
-rw-r--r-- 1 oscreader oscreader 755 Jan  3 2018 win32-pipe-child.c
-rw-r--r-- 1 oscreader oscreader 2236 Jan  3 2018 win32-pipe-parent.c
osh>ps
  PID TTY          TIME CMD
 1589 pts/2    00:00:00 bash
 1594 pts/2    00:00:00 simple-shell
 1597 pts/2    00:00:00 ps
osh>!!
  PID TTY          TIME CMD
 1589 pts/2    00:00:00 bash
 1594 pts/2    00:00:00 simple-shell
 1598 pts/2    00:00:00 ps
osh>ls
cat                fig3-33.c          newproc-win32.c    simple-shell.c
DateClient.java    fig3-34.c          pid.c              unix_pipe.c
DateServer.java    fig3-35.c          shehrozatir.txt    win32-pipe-child.c
fig3-30.c          multi-fork         shm-posix-consumer.c win32-pipe-parent.c
fig3-31.c          multi-fork.c       shm-posix-producer.c
fig3-32.c          newproc-posix.c    simple-shell
osh>!!
cat                fig3-33.c          newproc-win32.c    simple-shell.c
DateClient.java    fig3-34.c          pid.c              unix_pipe.c
DateServer.java    fig3-35.c          shehrozatir.txt    win32-pipe-child.c
fig3-30.c          multi-fork         shm-posix-consumer.c win32-pipe-parent.c
fig3-31.c          multi-fork.c       shm-posix-producer.c
fig3-32.c          newproc-posix.c    simple-shell
osh>
```

## Part IV:

[screenshot]



The screenshot shows a Linux terminal window titled "OSC-2016 [Running]". The window has a menu bar with "Activities", "Terminal", and a clock showing "Thu 11:18". The terminal prompt is "oscreader@OSC: ~/Desktop/final-src-osc10e/ch3". The user has executed the following commands:

```
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ./simple-shell
osh>ls -l > shehrozatir.txt
osh>^C
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ cat shehrozatir.txt
```

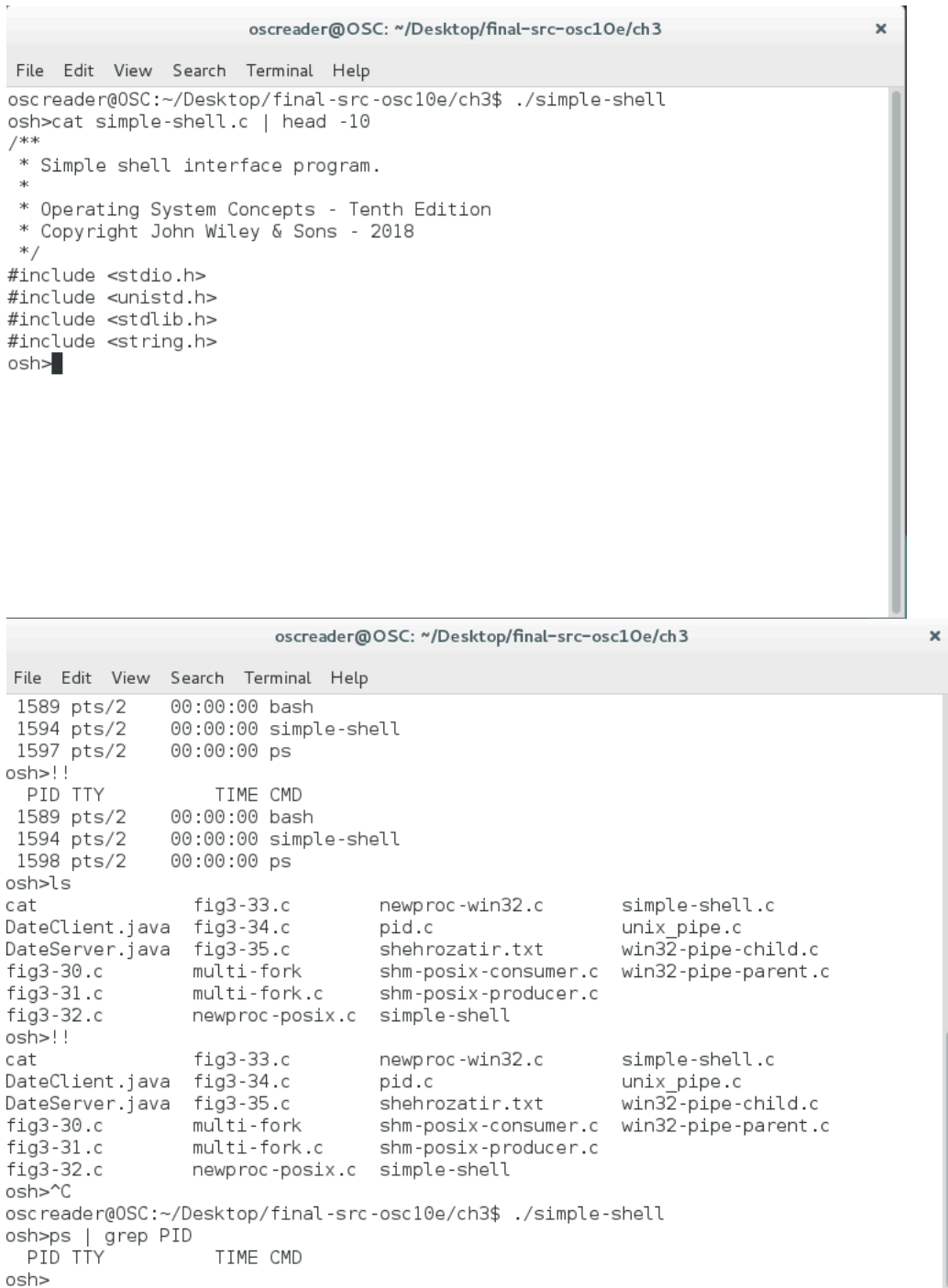
The output of the 'cat' command is a directory listing showing file permissions, owner, group, size, date, and filename for various files in the directory. The files listed are:

Permissions	Owner	Group	Size	Date	Filename
-rw-r--r--	1 oscreader	oscreader	0	Oct 27 05:12	cat
-rw-r--r--	1 oscreader	oscreader	710	Jan 3 2018	DateClient.java
-rw-r--r--	1 oscreader	oscreader	810	Jun 18 2018	DateServer.java
-rw-r--r--	1 oscreader	oscreader	361	Jun 18 2018	fig3-30.c
-rw-r--r--	1 oscreader	oscreader	121	Jan 3 2018	fig3-31.c
-rw-r--r--	1 oscreader	oscreader	136	Jan 3 2018	fig3-32.c
-rw-r--r--	1 oscreader	oscreader	500	Jun 18 2018	fig3-33.c
-rw-r--r--	1 oscreader	oscreader	680	Jun 18 2018	fig3-34.c
-rw-r--r--	1 oscreader	oscreader	534	Jun 18 2018	fig3-35.c
-rwxr-xr-x	1 oscreader	oscreader	8712	Jan 30 2018	multi-fork
-rw-r--r--	1 oscreader	oscreader	257	Jan 30 2018	multi-fork.c
-rw-r--r--	1 oscreader	oscreader	780	Jan 28 2018	newproc-posix.c
-rw-r--r--	1 oscreader	oscreader	1413	Jan 3 2018	newproc-win32.c
-rw-r--r--	1 oscreader	oscreader	2976	Jun 18 2018	pid.c
-rw-r--r--	1 oscreader	oscreader	0	Oct 29 11:18	shehrozatir.txt
-rw-r--r--	1 oscreader	oscreader	1115	Jun 18 2018	shm-posix-consumer.c
-rw-r--r--	1 oscreader	oscreader	1434	Jun 18 2018	shm-posix-producer.c
-rwxr-xr-x	1 oscreader	oscreader	8492	Oct 29 11:05	simple-shell
-rw-r--r--	1 oscreader	oscreader	6300	Oct 29 11:03	simple-shell.c
-rw-r--r--	1 oscreader	oscreader	1219	Jan 3 2018	unix_pipe.c
-rw-r--r--	1 oscreader	oscreader	755	Jan 3 2018	win32-pipe-child.c
-rw-r--r--	1 oscreader	oscreader	2236	Jan 3 2018	win32-pipe-parent.c

The terminal prompt is now "oscreader@OSC:~/Desktop/final-src-osc10e/ch3\$".

## Part V:

[screenshot]



The image shows two screenshots of a terminal window. The top screenshot shows the initial execution of the simple-shell program. The bottom screenshot shows the program running in the background, with the user running 'ps' and 'cat' to view the process list and file contents.

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ./simple-shell
osh>cat simple-shell.c | head -10
/**
 * Simple shell interface program.
 *
 * Operating System Concepts - Tenth Edition
 * Copyright John Wiley & Sons - 2018
 */
#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <string.h>
osh>
```

```
oscreader@OSC: ~/Desktop/final-src-osc10e/ch3
File Edit View Search Terminal Help
1589 pts/2    00:00:00 bash
1594 pts/2    00:00:00 simple-shell
1597 pts/2    00:00:00 ps
osh>!!
  PID TTY          TIME CMD
 1589 pts/2    00:00:00 bash
 1594 pts/2    00:00:00 simple-shell
 1598 pts/2    00:00:00 ps
osh>ls
cat          fig3-33.c      newproc-win32.c  simple-shell.c
DateClient.java  fig3-34.c      pid.c            unix_pipe.c
DateServer.java  fig3-35.c      shehrozatir.txt  win32-pipe-child.c
fig3-30.c        multi-fork     shm-posix-consumer.c  win32-pipe-parent.c
fig3-31.c        multi-fork.c   shm-posix-producer.c
fig3-32.c        newproc-posix.c simple-shell
osh>!!
cat          fig3-33.c      newproc-win32.c  simple-shell.c
DateClient.java  fig3-34.c      pid.c            unix_pipe.c
DateServer.java  fig3-35.c      shehrozatir.txt  win32-pipe-child.c
fig3-30.c        multi-fork     shm-posix-consumer.c  win32-pipe-parent.c
fig3-31.c        multi-fork.c   shm-posix-producer.c
fig3-32.c        newproc-posix.c simple-shell
osh>^C
oscreader@OSC:~/Desktop/final-src-osc10e/ch3$ ./simple-shell
osh>ps | grep PID
  PID TTY          TIME CMD
osh>
```