



**MARMARA UNIVERSITY**

**FACULTY OF ENGINEERING  
COMPUTER SCIENCE & ENGINEERING  
DEPARTMENT**

**CSE3033  
OPERATING SYSTEMS  
Report of Programming Assignment #2**

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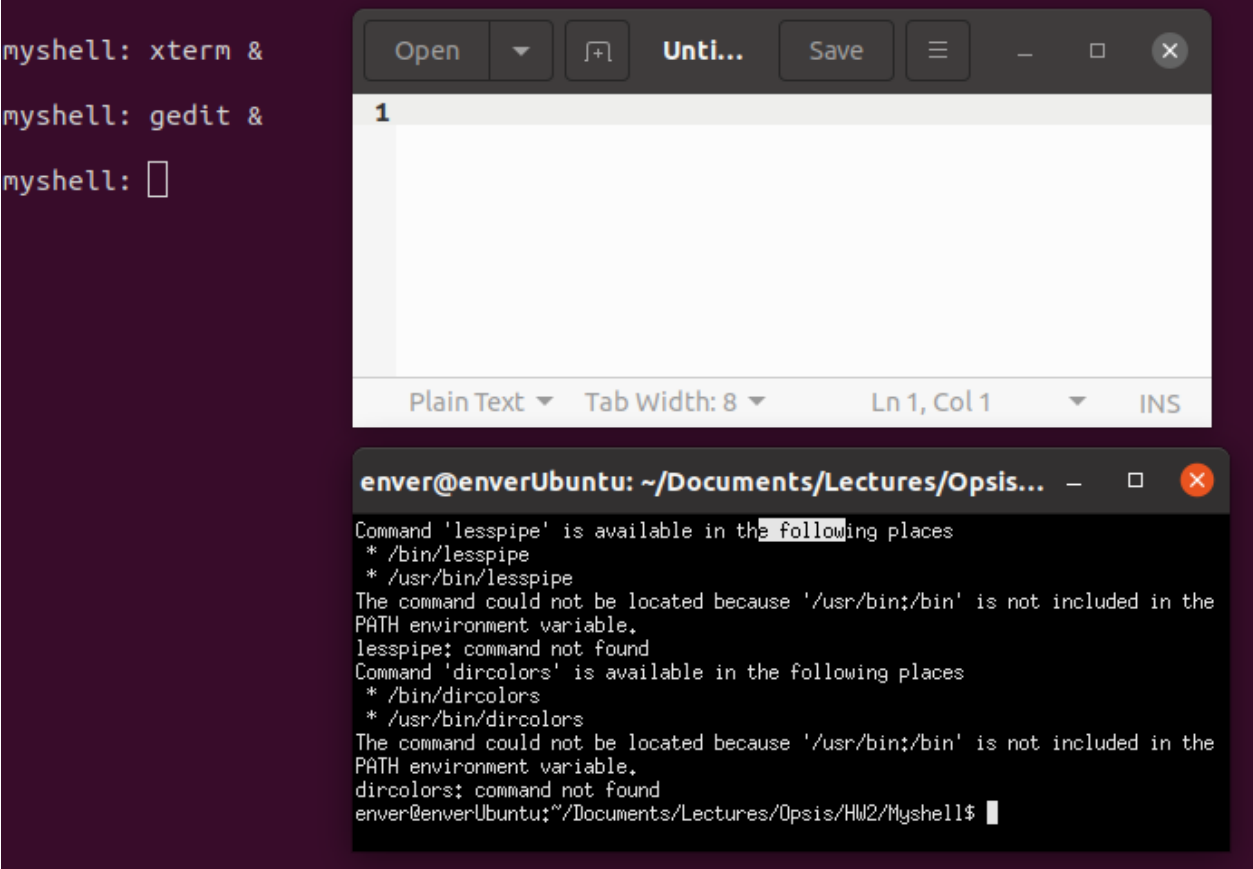
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## A) New Processes

Our shell implementation supports both foreground and background process executions.

Down below, you can see some screenshots of our part A test cases:

### Background Applications

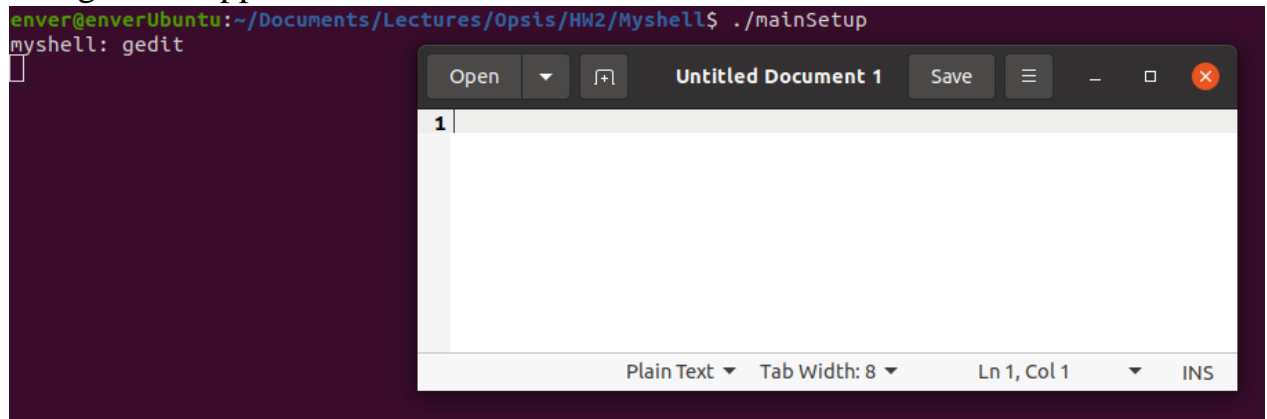


The screenshot displays a terminal window on the left and a file editor window on the right. The terminal window shows the following commands and output:

```
myshell: xterm &  
myshell: gedit &  
myshell:   
enver@enverUbuntu: ~/Documents/Lectures/Opsis/HW2/Myshell$
```

The file editor window, titled "Untitled", shows a blank document with the status bar indicating "Plain Text", "Tab Width: 8", "Ln 1, Col 1", and "INS".

## Foreground Application



## B) Built-in Functions

Our shell implementation also supports internal (built-in) commands which are “search” and “bookmark”. During the implementation of built-in functions, instead of creating new processes, we’ve created built-in functions in order to execute them appropriately, just like the way it has to be.

Down below, you can see some screenshots of our part B test cases:

### Search

```
myshell: search "lineNumber"
964: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> int lineNumber = 1;
979: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> printf("%d: %s\n", lineNumber, curWorkingDir, fileName, temp);
982: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> lineNumber++;
1020: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> int lineNumber = 1;
1032: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> printf("%d: %s\n", lineNumber, fileName, temp);
1035: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> lineNumber++;
```

### Search Recursive

```
myshell: search -r "main"
5: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/test_prog.c -> int main(int argc, char const *argv[])
71: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/mainSetup.c -> int main(void)
73: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/test/mainyedek.c -> int main(void)
3: /home/enver/Documents/Lectures/Opsis/HW2/Myshell/test_stderr.c -> int main(void) {
```

## Bookmark Insert

```
myshell: bookmark "ls -l"
myshell: bookmark "ls -a"
myshell: bookmark "ps -a"
myshell: bookmark -l
0 "ls -l"
1 "ls -a"
2 "ps -a"
```

## Bookmark List & Bookmark Delete

```
myshell: bookmark -l
0 "ls -l"
1 "ls -a"
2 "ps -a"

myshell: bookmark -d 2

myshell: bookmark -l
0 "ls -l"
1 "ls -a"

myshell: █
```

## Bookmark Execute

```
myshell: bookmark -i 0
total 232
-rw-rw-r-- 1 enver enver    50 Ara 31 00:59 a.txt
-rw-rw-r-- 1 enver enver 90145 Ara 22 02:53 CSE3033_Project2.pdf
-rw-rw-r-- 1 enver enver     9 Ara 31 00:59 c.txt
-rw-r--r-- 1 enver enver    64 Ara 31 20:37 err.txt
-rw-rw-r-- 1 enver enver     3 Ara 31 00:59 input.txt
-rwxrwxr-x 1 enver enver 27360 Ara 31 21:57 mainSetup
-rw-rw-r-- 1 enver enver 33118 Ara 31 21:56 mainSetup.c
-rw-rw-r-- 1 enver enver     9 Ara 31 20:36 output.txt
-rw-rw-r-- 1 enver enver    13 Ara 22 02:53 README.md
drwxrwxr-x 2 enver enver   4096 Ara 31 19:55 test
-rwxrwxr-x 1 enver enver 16808 Ara 31 00:59 test_prog
-rw-rw-r-- 1 enver enver   246 Ara 31 00:59 test_prog.c
-rwxrwxr-x 1 enver enver 16752 Ara 31 00:59 test_stderr
-rw-rw-r-- 1 enver enver   226 Ara 31 00:59 test_stderr.c
```

## C) I/O Redirections

Our shell supports I/O redirection on both stdin and stdout with appropriate input arguments.

Down below, you can see some screenshots of our Part C test cases:

### Standard Output

```
myshell: ls -l > output.txt

myshell: cat output.txt
total 228
-rw-rw-r-- 1 enver enver    50 Ara 31 00:59 a.txt
-rw-rw-r-- 1 enver enver 90145 Ara 22 02:53 CSE3033_Project2.pdf
-rw-rw-r-- 1 enver enver     9 Ara 31 00:59 c.txt
-rw-r--r-- 1 enver enver    64 Ara 31 20:37 err.txt
-rw-rw-r-- 1 enver enver     3 Ara 31 00:59 input.txt
-rwxrwxr-x 1 enver enver 27360 Ara 31 21:57 mainSetup
-rw-rw-r-- 1 enver enver 33118 Ara 31 21:56 mainSetup.c
-rw-rw-r-- 1 enver enver     0 Ara 31 22:07 output.txt
-rw-rw-r-- 1 enver enver    13 Ara 22 02:53 README.md
drwxrwxr-x 2 enver enver  4096 Ara 31 19:55 test
-rwxrwxr-x 1 enver enver 16808 Ara 31 00:59 test_prog
-rw-rw-r-- 1 enver enver   246 Ara 31 00:59 test_prog.c
-rwxrwxr-x 1 enver enver 16752 Ara 31 00:59 test_stderr
-rw-rw-r-- 1 enver enver   226 Ara 31 00:59 test_stderr.c

myshell: █
```

## Append

```
myshell: ls -l >> output.txt
```

```
myshell: cat output.txt
```

```
total 228
-rw-rw-r-- 1 enver enver    50 Ara 31 00:59 a.txt
-rw-rw-r-- 1 enver enver 90145 Ara 22 02:53 CSE3033_Project2.pdf
-rw-rw-r-- 1 enver enver     9 Ara 31 00:59 c.txt
-rw-r--r-- 1 enver enver    64 Ara 31 20:37 err.txt
-rw-rw-r-- 1 enver enver     3 Ara 31 00:59 input.txt
-rwxrwxr-x 1 enver enver 27360 Ara 31 21:57 mainSetup
-rw-rw-r-- 1 enver enver 33118 Ara 31 21:56 mainSetup.c
-rw-rw-r-- 1 enver enver     0 Ara 31 22:07 output.txt
-rw-rw-r-- 1 enver enver    13 Ara 22 02:53 README.md
drwxrwxr-x 2 enver enver  4096 Ara 31 19:55 test
-rwxrwxr-x 1 enver enver 16808 Ara 31 00:59 test_prog
-rw-rw-r-- 1 enver enver   246 Ara 31 00:59 test_prog.c
-rwxrwxr-x 1 enver enver 16752 Ara 31 00:59 test_stderr
-rw-rw-r-- 1 enver enver   226 Ara 31 00:59 test_stderr.c
total 232
-rw-rw-r-- 1 enver enver    50 Ara 31 00:59 a.txt
-rw-rw-r-- 1 enver enver 90145 Ara 22 02:53 CSE3033_Project2.pdf
-rw-rw-r-- 1 enver enver     9 Ara 31 00:59 c.txt
-rw-r--r-- 1 enver enver    64 Ara 31 20:37 err.txt
-rw-rw-r-- 1 enver enver     3 Ara 31 00:59 input.txt
-rwxrwxr-x 1 enver enver 27360 Ara 31 21:57 mainSetup
-rw-rw-r-- 1 enver enver 33118 Ara 31 21:56 mainSetup.c
-rw-rw-r-- 1 enver enver   773 Ara 31 22:07 output.txt
-rw-rw-r-- 1 enver enver    13 Ara 22 02:53 README.md
drwxrwxr-x 2 enver enver  4096 Ara 31 19:55 test
-rwxrwxr-x 1 enver enver 16808 Ara 31 00:59 test_prog
-rw-rw-r-- 1 enver enver   246 Ara 31 00:59 test_prog.c
-rwxrwxr-x 1 enver enver 16752 Ara 31 00:59 test_stderr
-rw-rw-r-- 1 enver enver   226 Ara 31 00:59 test_stderr.c
```

## Standard Input

```
myshell: test_prog < input.txt
```

```
4 + 5 = 9
```

```
myshell: █
```

## Standard Error

```
myshell: cat test_stderr.c
#include <stdio.h>

int main(void) {
    fprintf(stderr,"%s\n", "I give an error");
    fprintf(stderr,"%s\n", "I give 2 errors");
    fprintf(stderr,"%s\n", "I give 3 errors");
    fprintf(stderr,"%s\n", "I give 4 errors");
}
myshell: test_stderr 2> err.txt

myshell: cat err.txt
I give an error
I give 2 errors
I give 3 errors
I give 4 errors
```

## Both Standard Input & Standard Output

```
myshell: test_prog < input.txt > result.txt

myshell: cat result.txt
4 + 5 = 9
myshell: █
```