King Abdulaziz University
College of Engineering (CoE)
Winter 2023 – Operating Systems (EE463)

EE463 – Operating Systems

LAB #2

Tutorials on the Unix Shell & vim editor

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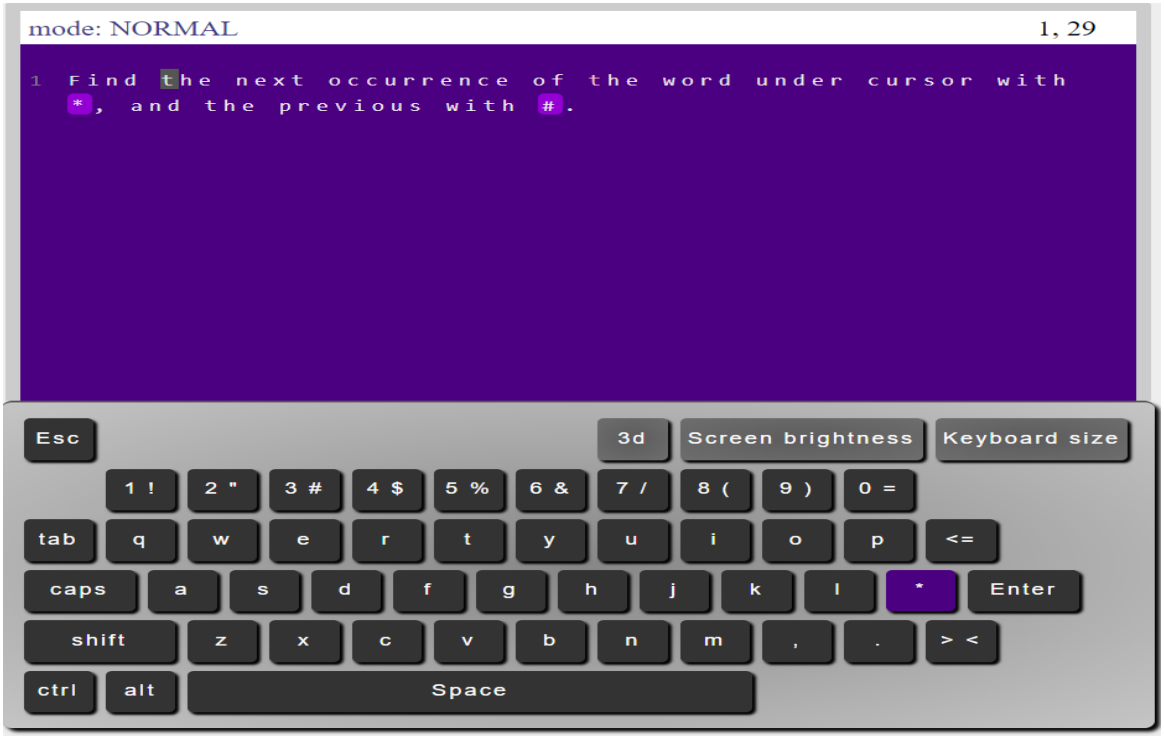
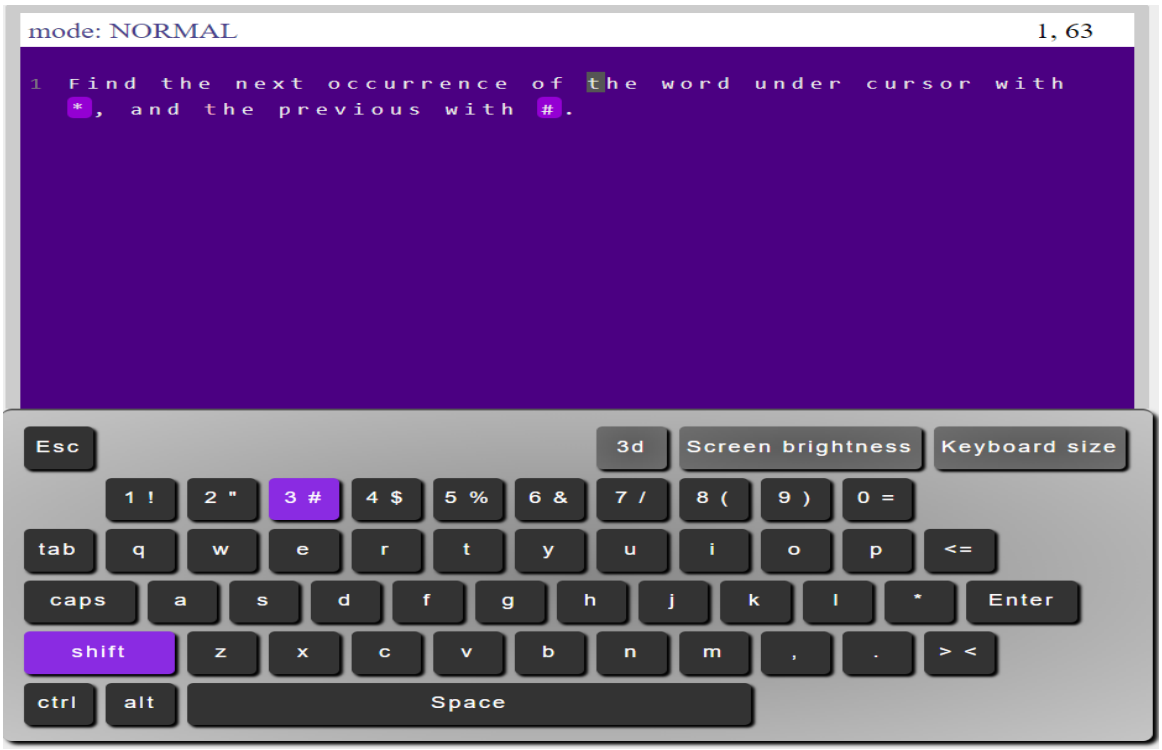
Eng. Turki Gary

The vim Text Editor:

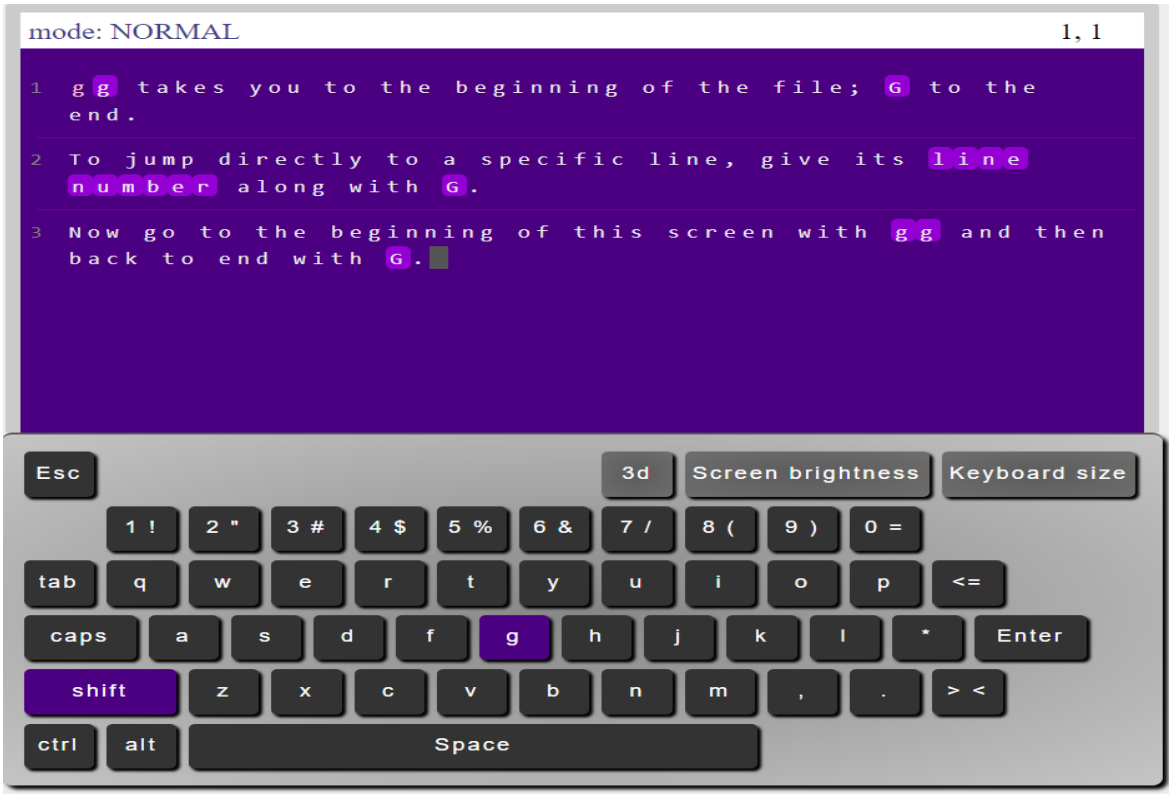
10. Find word under cursor, * and #)





To find the next occurrence of the word under the curser we use the “*” button, while finding the previous occurrence is done by the “#” button

11. Goto line, g and G)

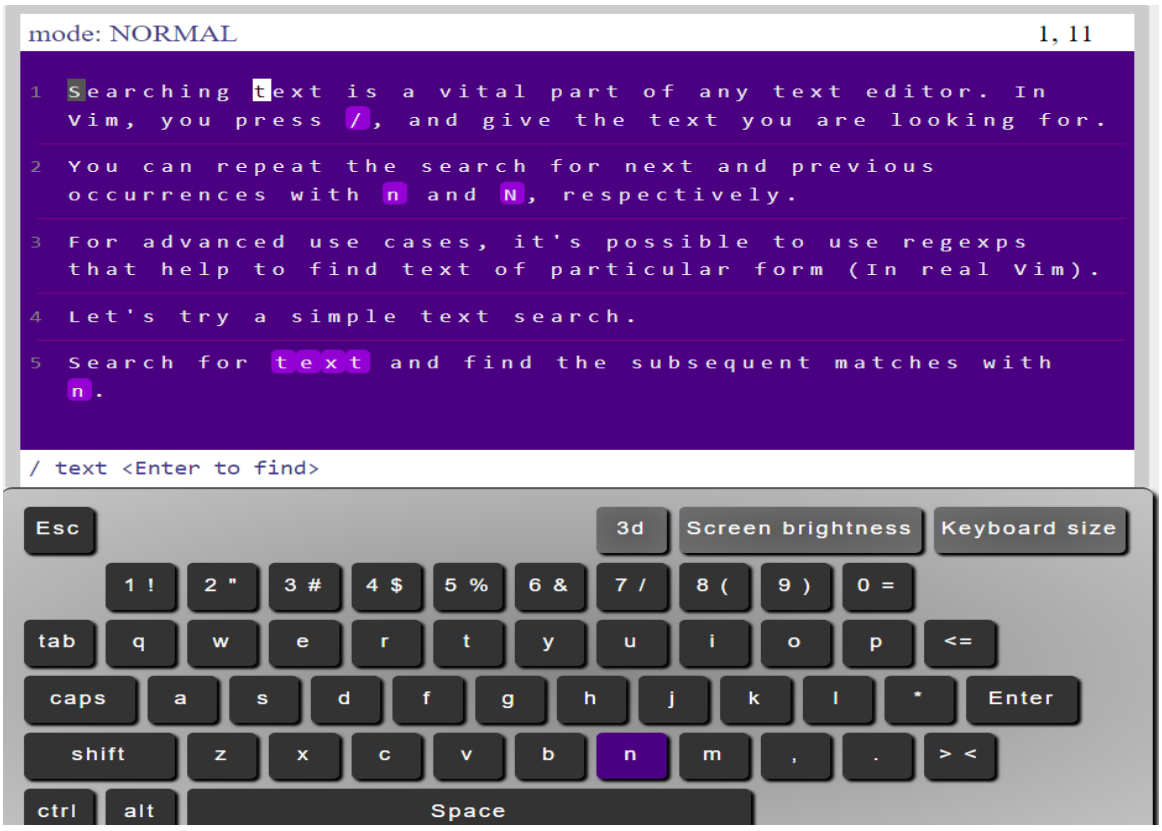

mode: NORMAL
1, 1
1 gg takes you to the beginning of the file; G to the end.
2 To jump directly to a specific line, give its line number along with G.
3 Now go to the beginning of this screen with gg and then back to end with G.
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

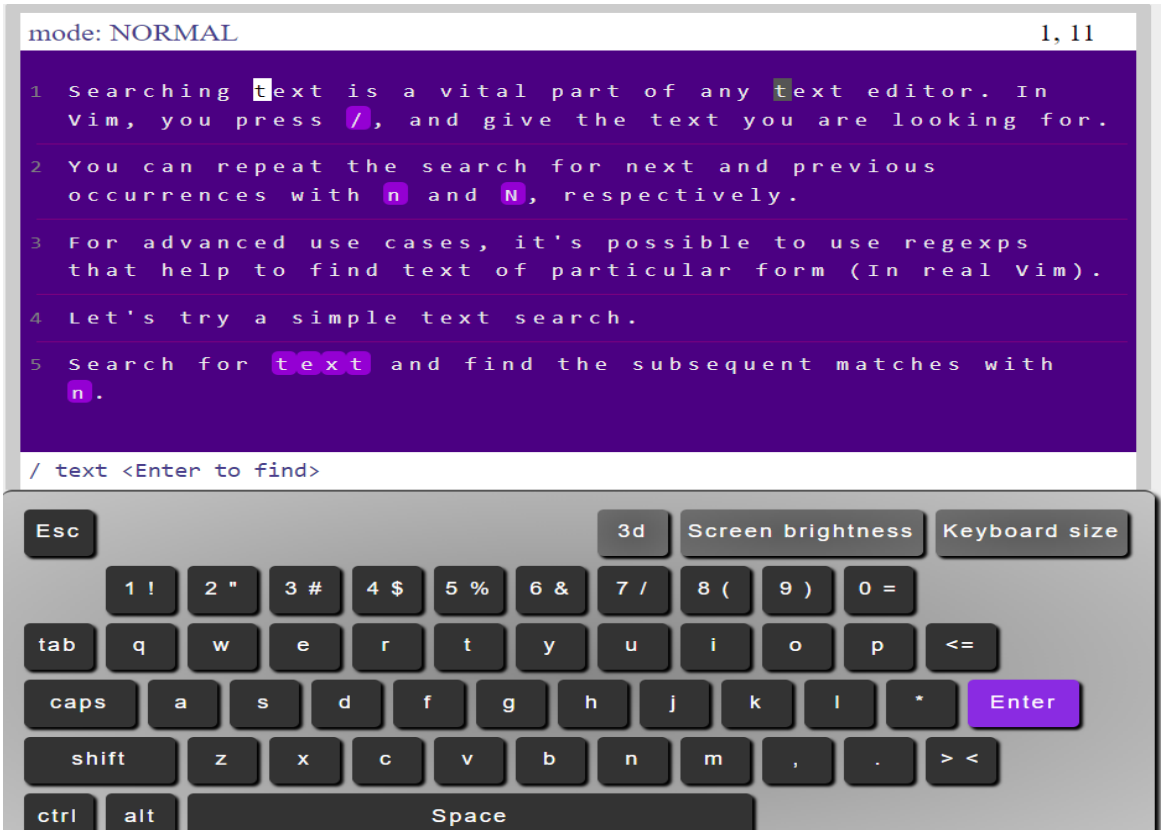

mode: NORMAL
3, 76
1 gg takes you to the beginning of the file; G to the end.
2 To jump directly to a specific line, give its line number along with G.
3 Now go to the beginning of this screen with gg and then back to end with G.
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

Use gg command to go to the beginning of the file, while using G command will put the cursor into the end of the file

When you want to go to specific line you can type line number followed by G

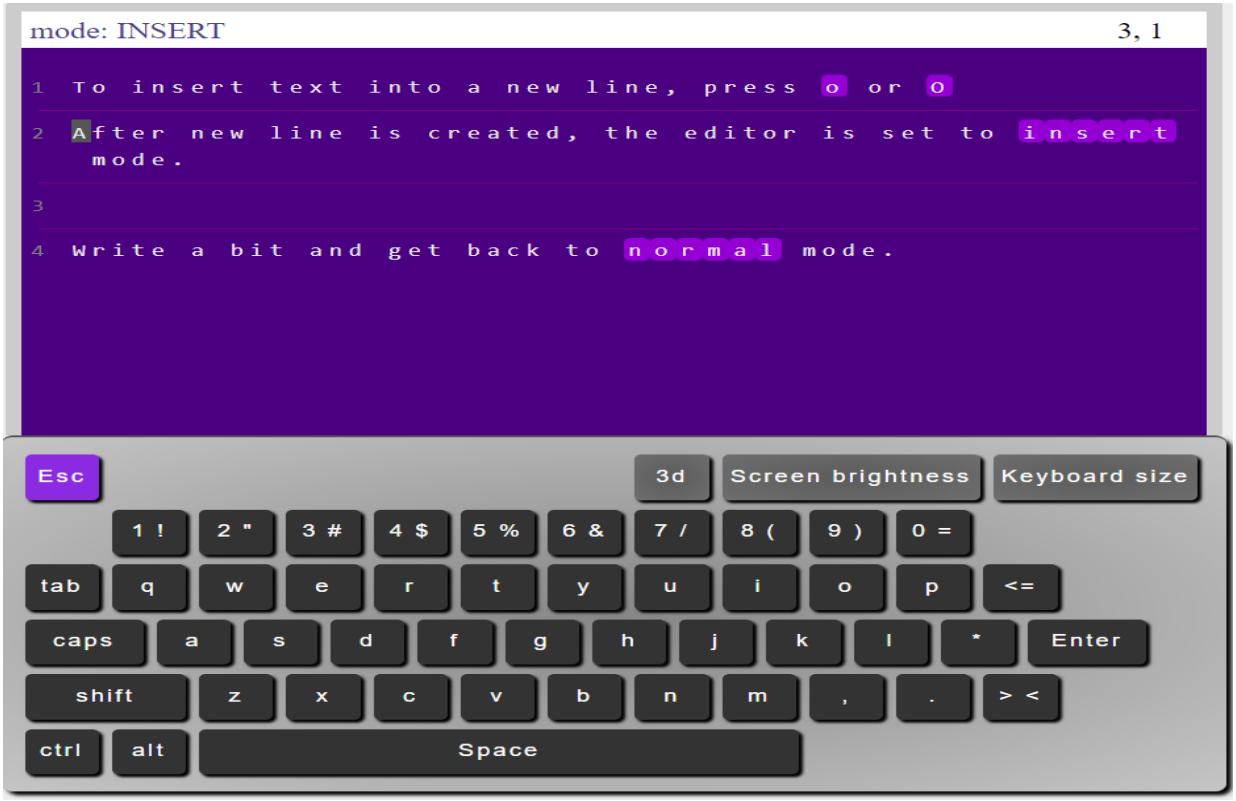
12. Search, /text with n and N)


mode: NORMAL 1, 11
1 Searching text is a vital part of any text editor. In Vim, you press /, and give the text you are looking for.
2 You can repeat the search for next and previous occurrences with n and N, respectively.
3 For advanced use cases, it's possible to use regexps that help to find text of particular form (In real Vim).
4 Let's try a simple text search.
5 Search for text and find the subsequent matches with n.
/ text <Enter to find>
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space


mode: NORMAL 1, 11
1 Searching text is a vital part of any text editor. In Vim, you press /, and give the text you are looking for.
2 You can repeat the search for next and previous occurrences with n and N, respectively.
3 For advanced use cases, it's possible to use regexps that help to find text of particular form (In real Vim).
4 Let's try a simple text search.
5 Search for text and find the subsequent matches with n.
/ text <Enter to find>
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

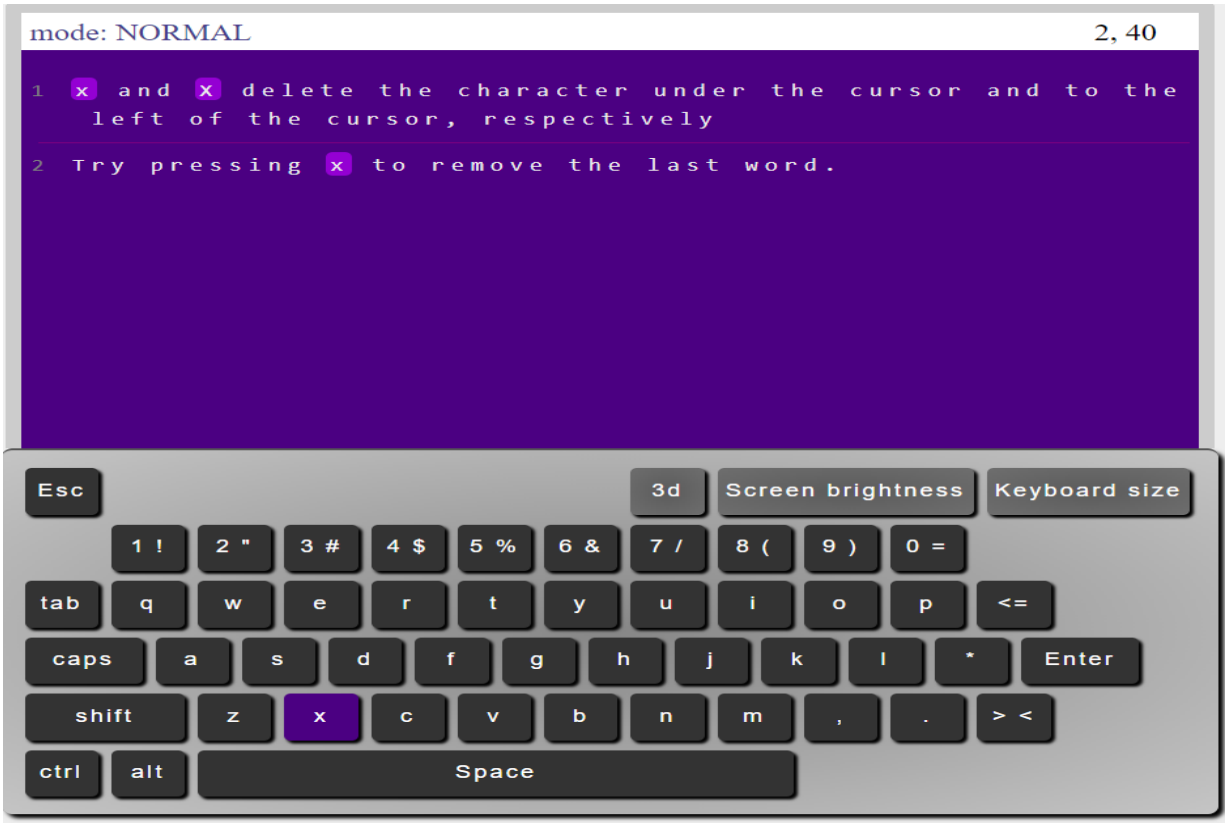
To search for specific keyword press / button then type the desired string, if you want to find the next occurrence press n button.

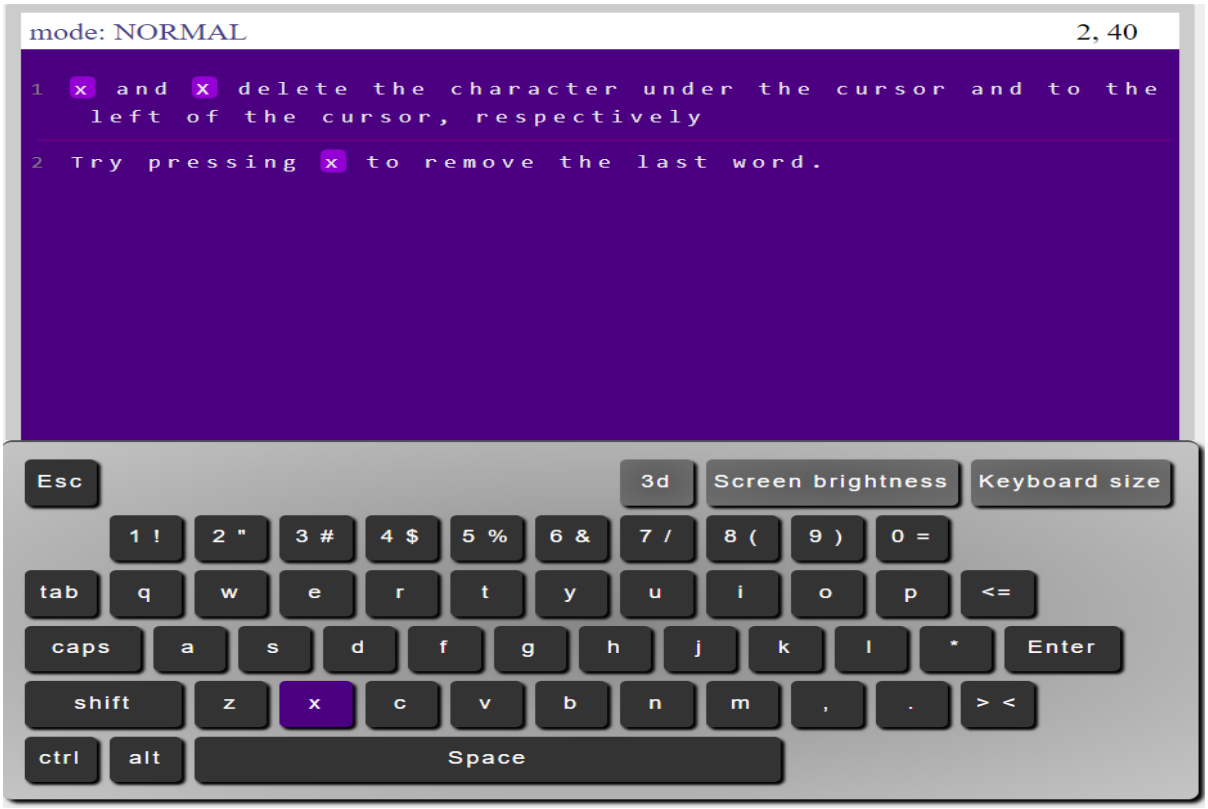
13. Insert new line, o and O)



When you want to insert new line press the o button or O which will append a new line and switch to insert mode.

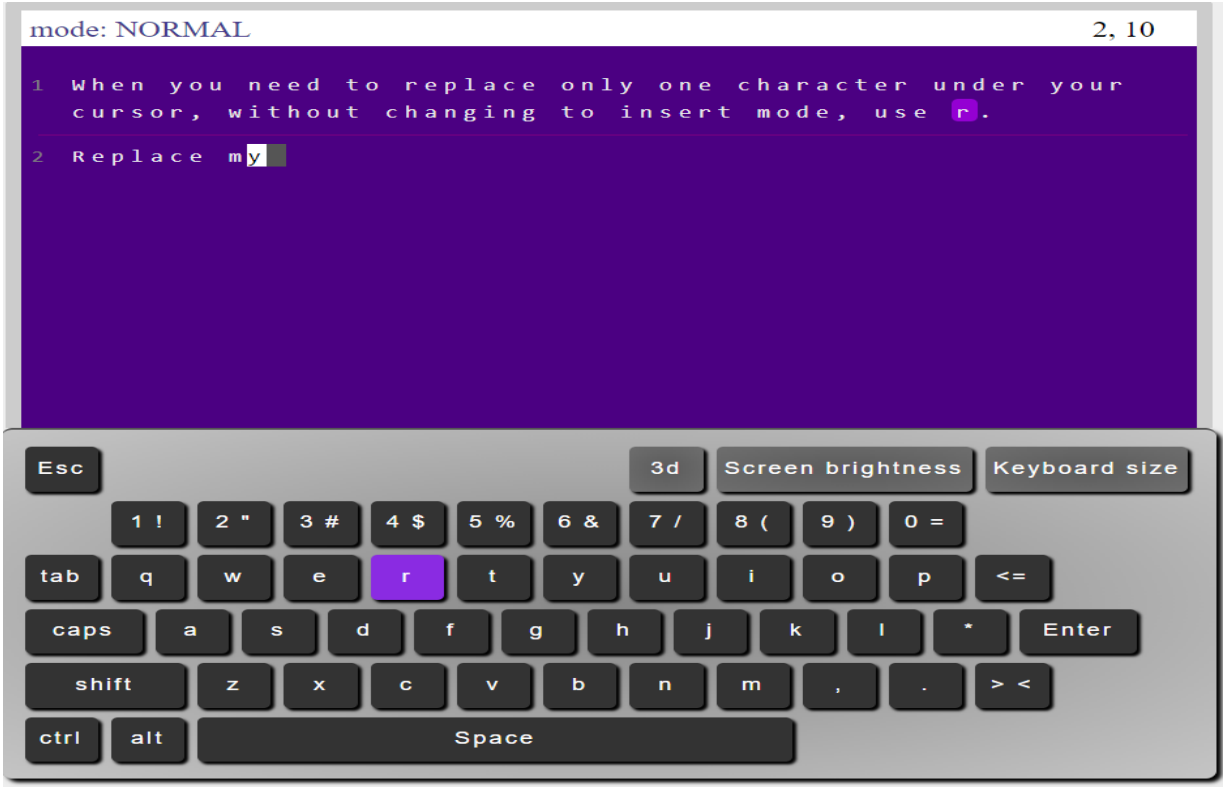
14. Removing a character, x and X)

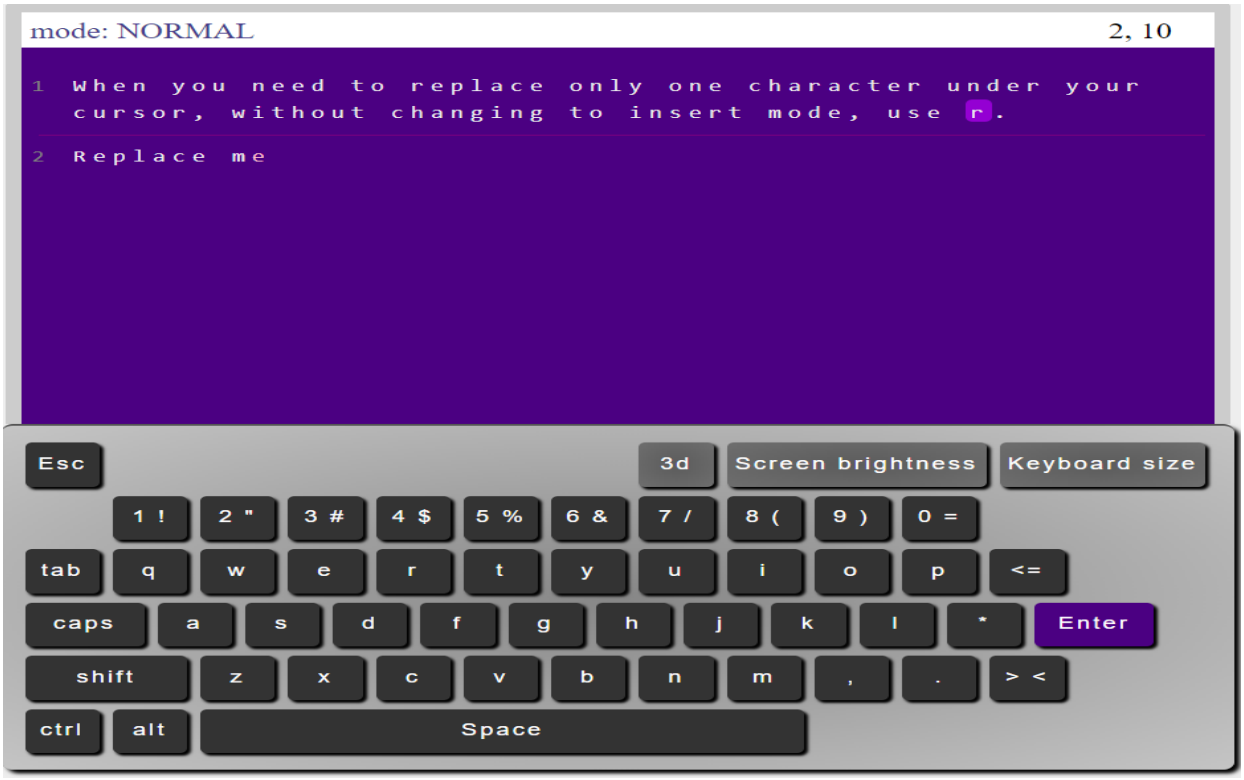

mode: NORMAL
2, 40
1 x and x delete the character under the cursor and to the left of the cursor, respectively
2 Try pressing x to remove the last word.
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space


mode: NORMAL
2, 40
1 x and x delete the character under the cursor and to the left of the cursor, respectively
2 Try pressing x to remove the last word.
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

If you want to delete the character under the cursor then press x button, pressing x repeatedly will delete the characters in the left.

15. Replacing letter under cursor, r)

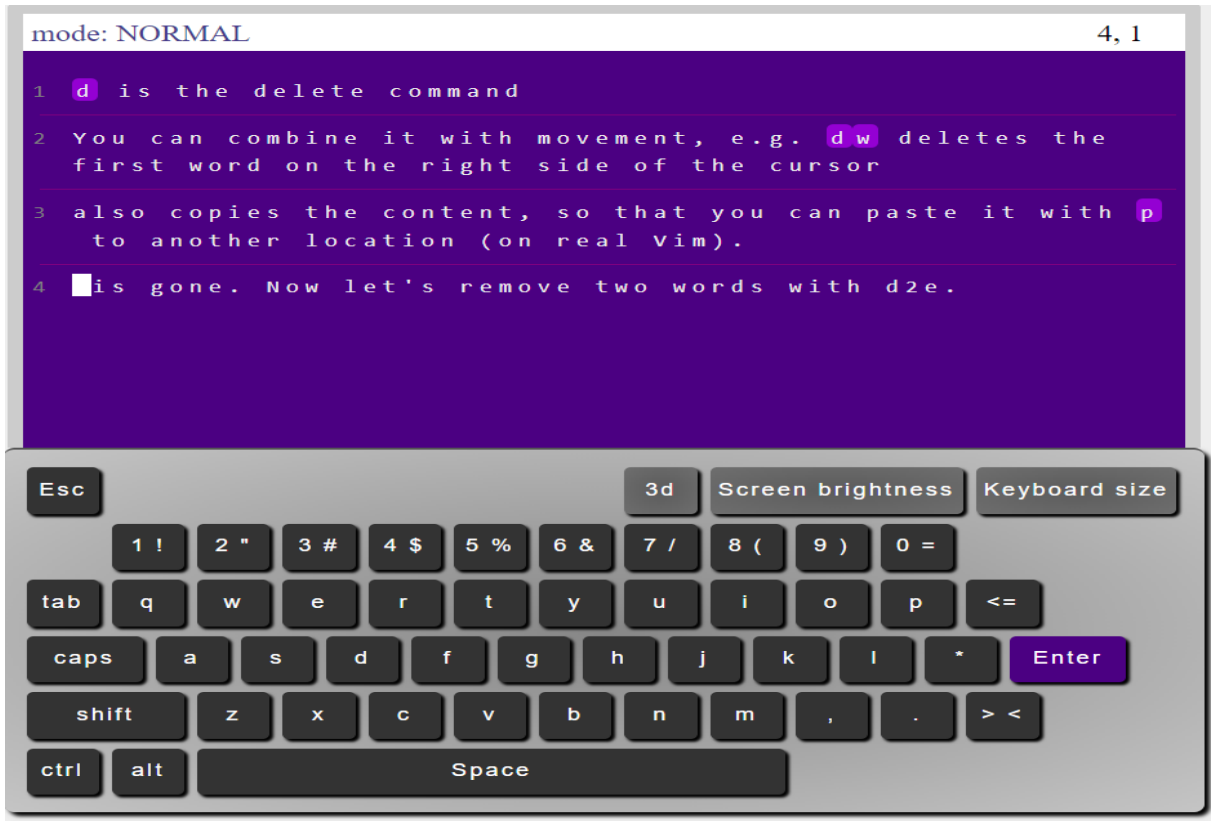




If you want to replace the character under the cursor, just press r then the letter to replace.

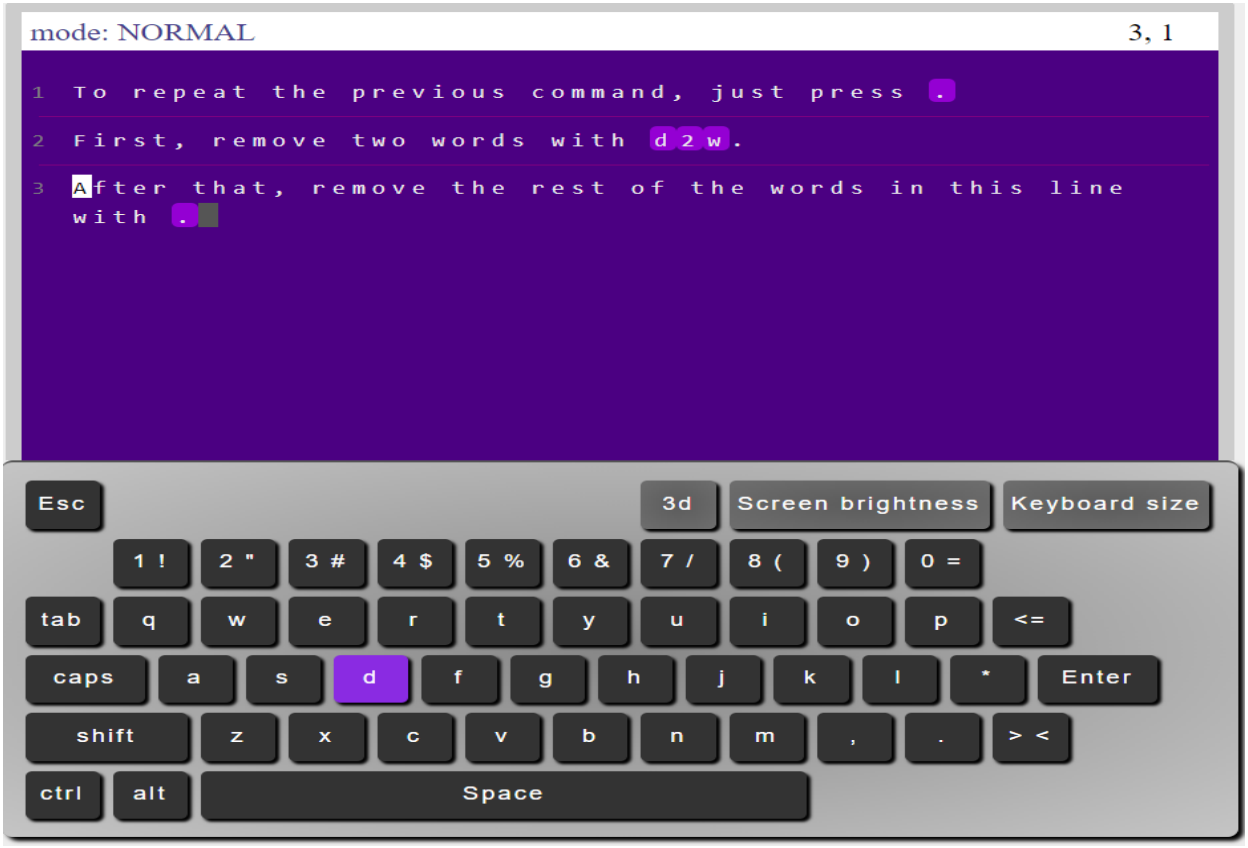
16. Deleting, d)

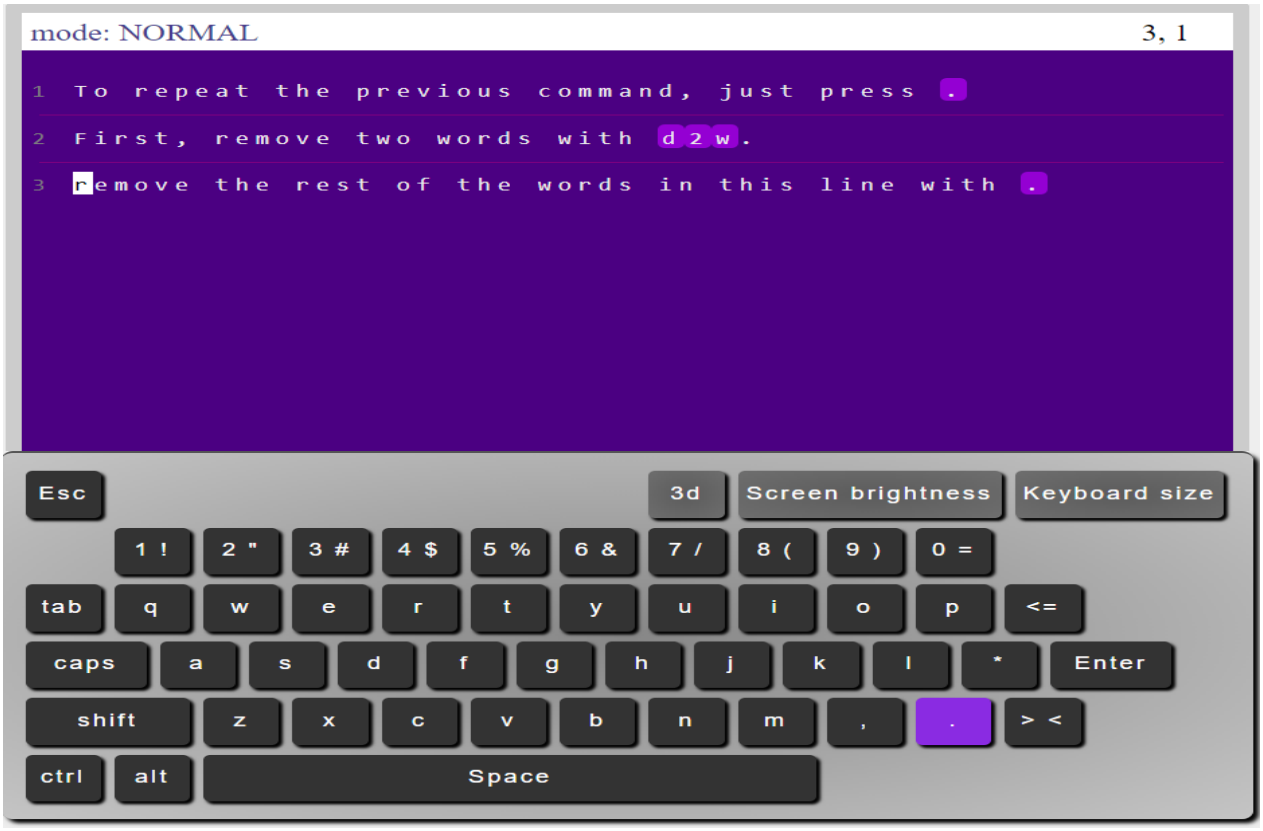

mode: NORMAL
3, 1
1 d is the delete command
2 You can combine it with movement, e.g. d w deletes the first word on the right side of the cursor
3 also copies the content, so that you can paste it with p to another location (on real Vim).
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

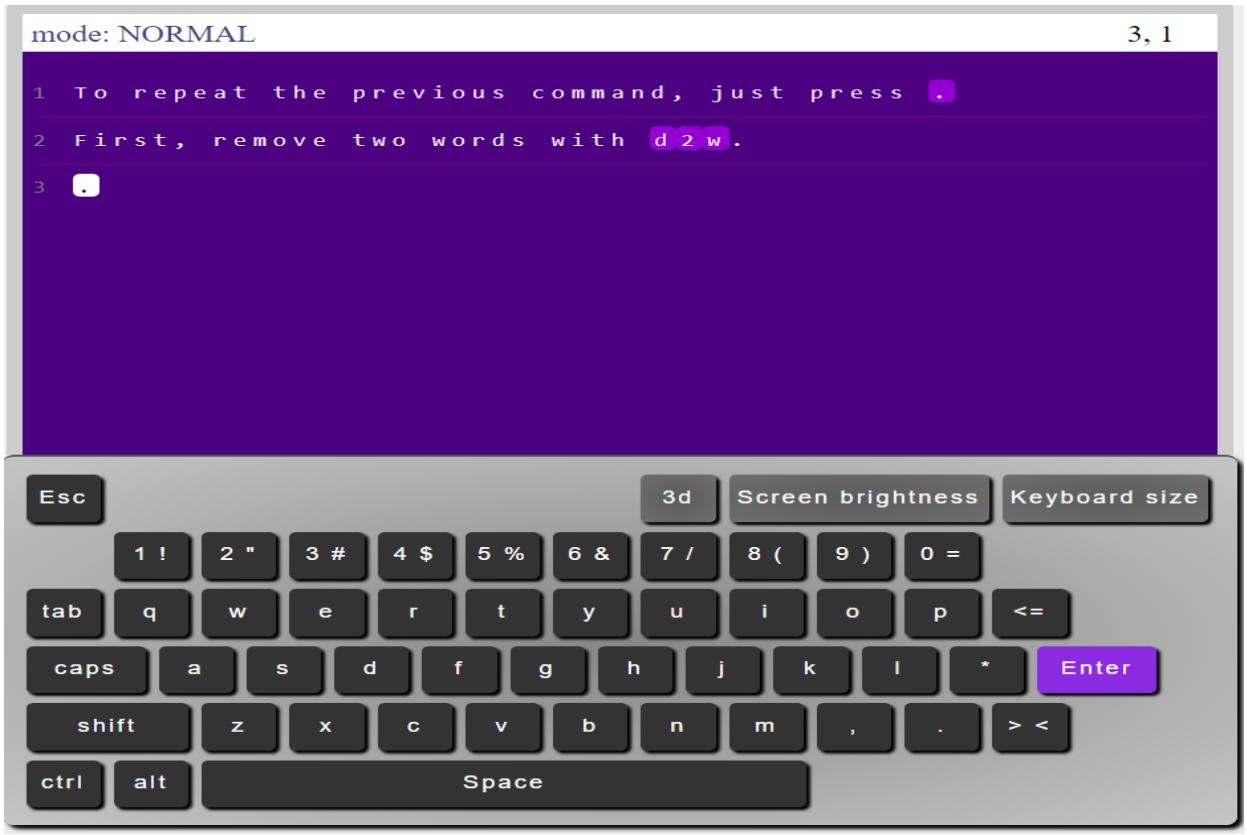

mode: NORMAL
4, 1
1 d is the delete command
2 You can combine it with movement, e.g. d w deletes the first word on the right side of the cursor
3 also copies the content, so that you can paste it with p to another location (on real Vim).
4 is gone. Now let's remove two words with d2e.
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

In order to delete a word just press d then w, if you want to delete more than one word just press dne; where n is the number of words you want to delete

17. Repetition with .)

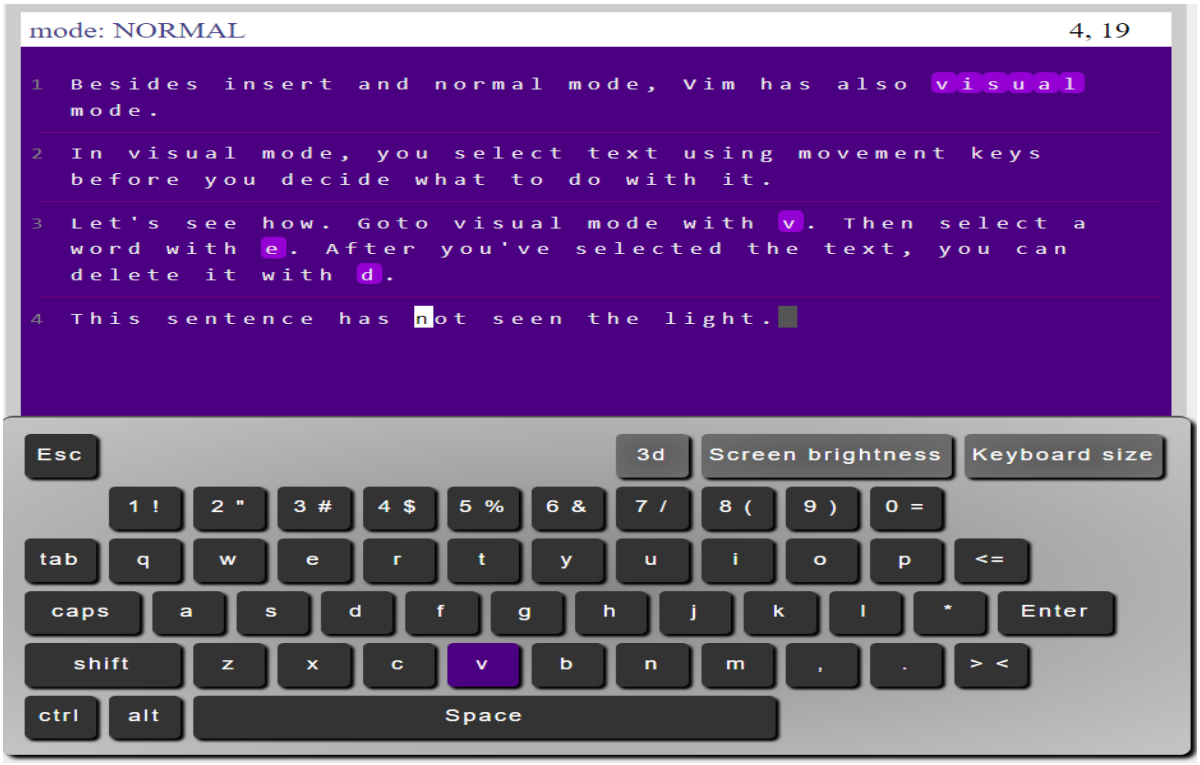


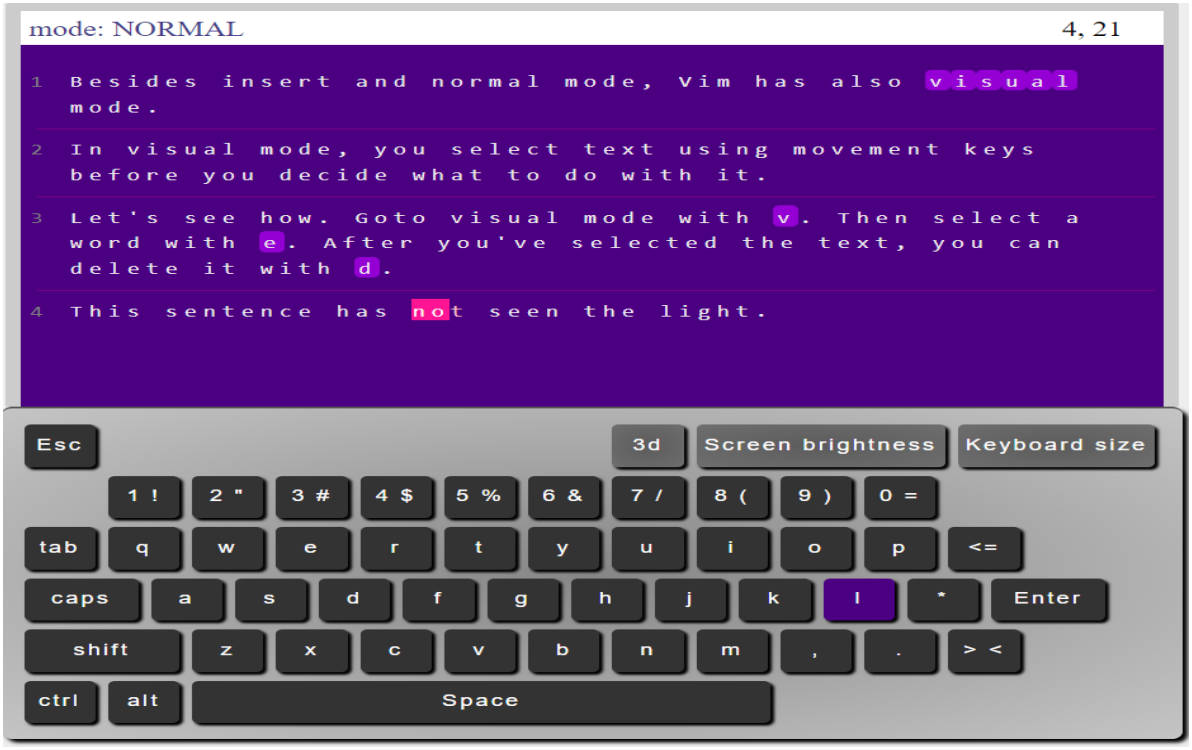

mode: NORMAL
3, 1
1 To repeat the previous command, just press .
2 First, remove two words with d 2 w.
3 remove the rest of the words in this line with .
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

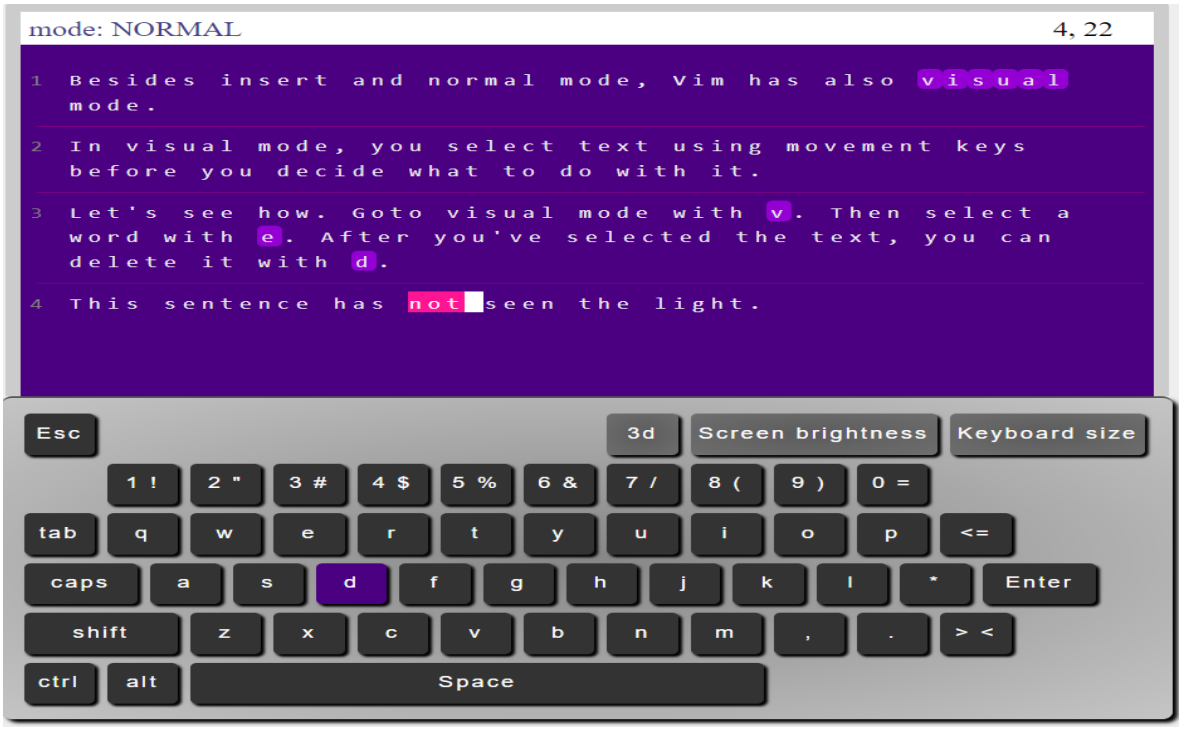

mode: NORMAL
3, 1
1 To repeat the previous command, just press .
2 First, remove two words with d 2 w.
3 .
Esc
3d
Screen brightness
Keyboard size
1 ! 2 " 3 # 4 $ 5 % 6 & 7 / 8 (9) 0 =
tab q w e r t y u i o p <=
caps a s d f g h j k l * Enter
shift z x c v b n m , . > <
ctrl alt Space

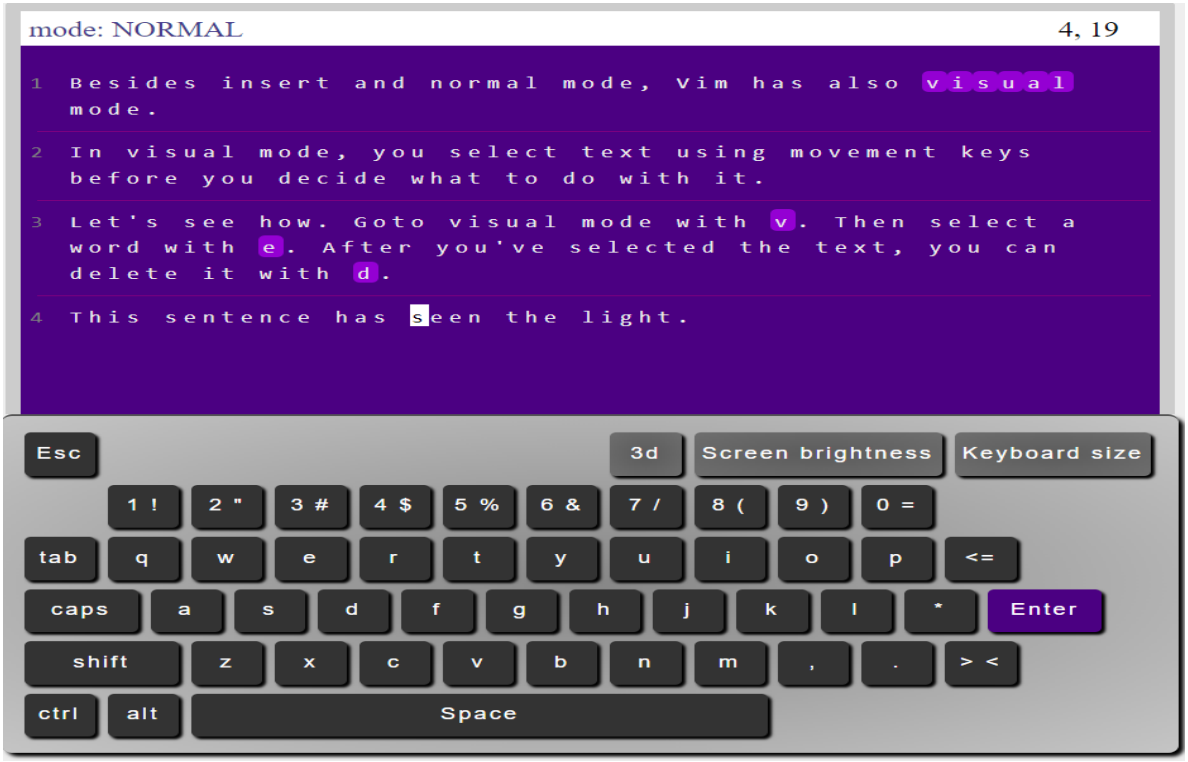
To repeat the previous command just press “.” Button.

18. Visual mode, v)



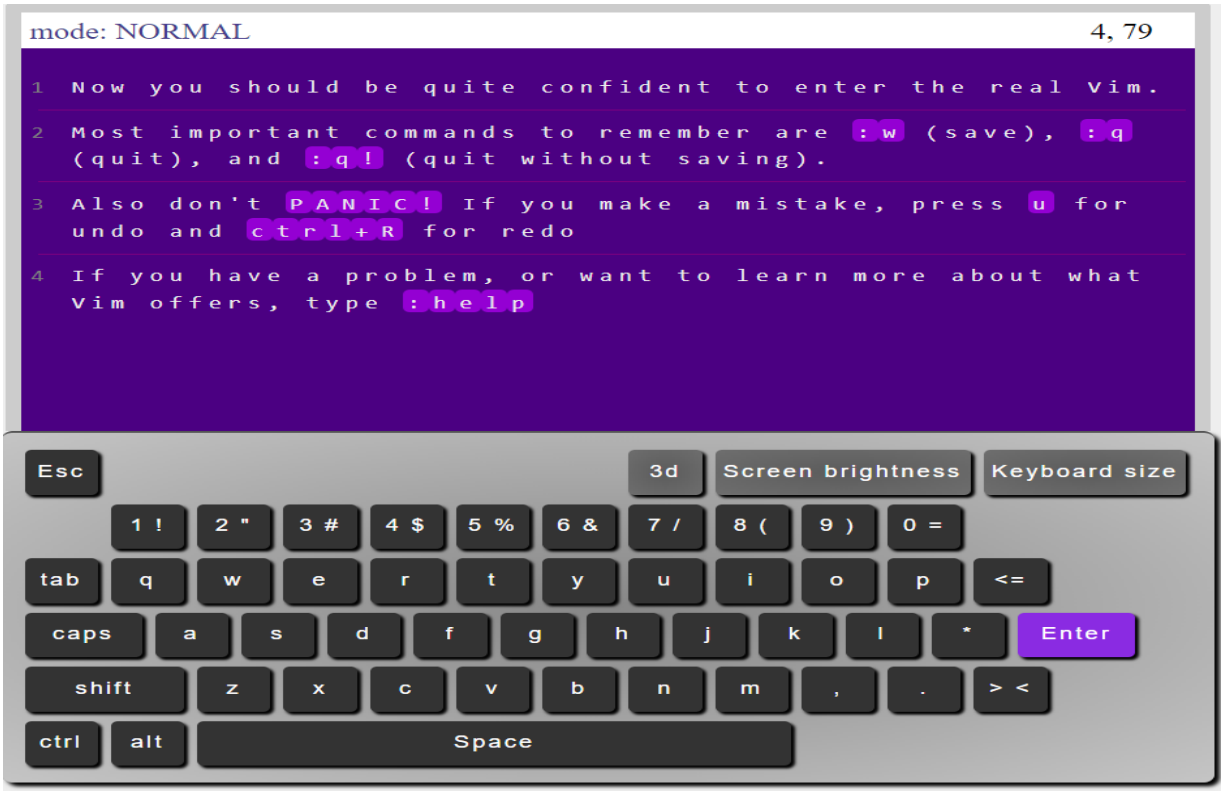




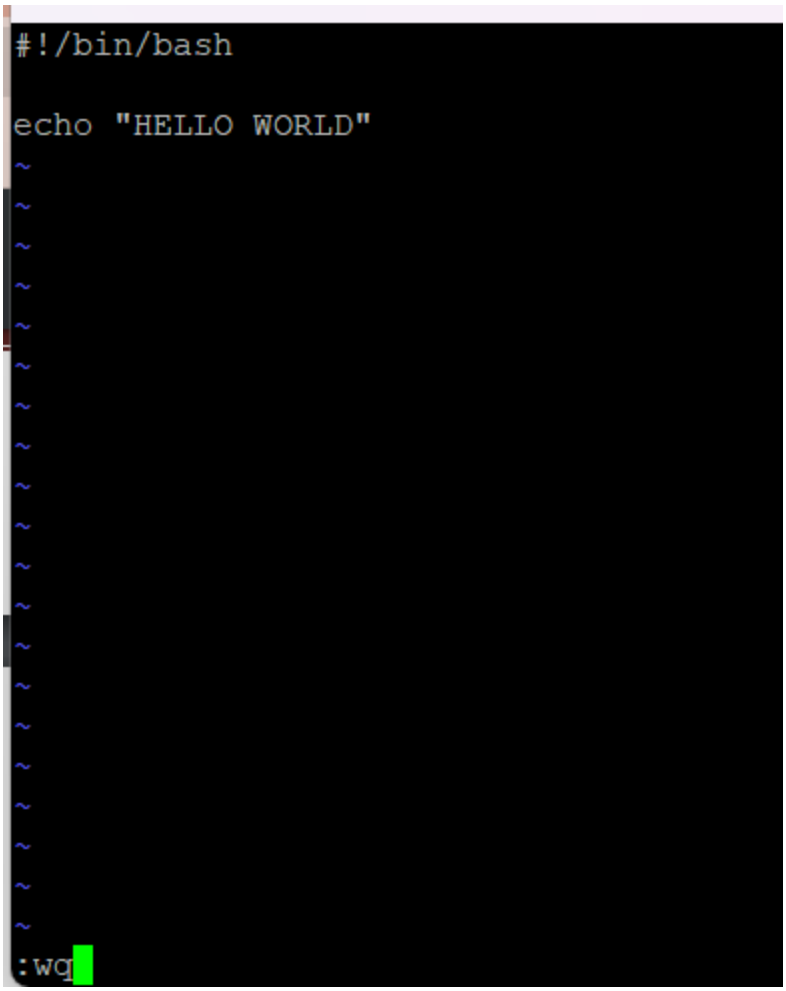


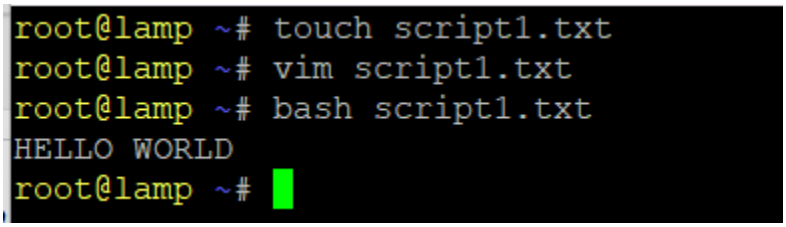
Visual mode helps you to select text before you perform other operations such as deleting, and inserting, you can switch t visual mode by pressing “V” button.

19.Real Vim awaits)



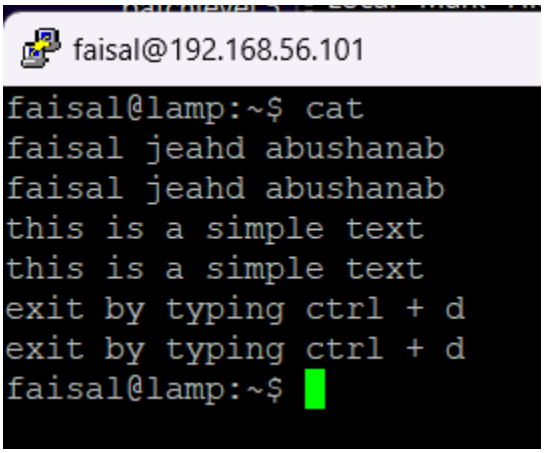
Vim has powerful commands. For example, if you want to quit and save the changes press :wq, if you want to undo press u and ctrl + R for redo. For further help press :help


#!/bin/bash
echo "HELLO WORLD"
:wq


root@lamp ~# touch script1.txt
root@lamp ~# vim script1.txt
root@lamp ~# bash script1.txt
HELLO WORLD
root@lamp ~#

More Unix Commands:

3.1 Redirection

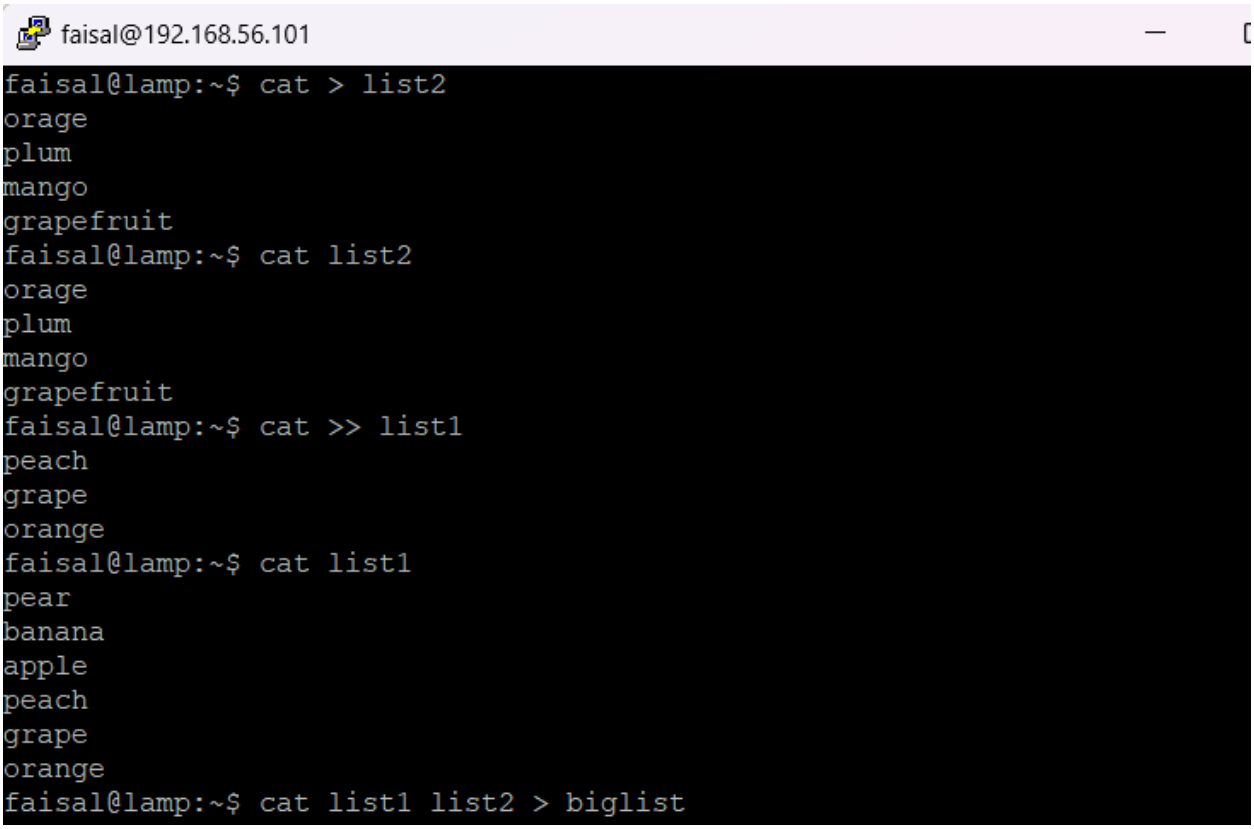


Cat without specifying file

3.2 Redirecting the Output

Redirect the output of cat into list1 file

Exercise 3a



3.3 Redirecting the Input

```
root@lamp ~# sort
carrot
beetroot
beetroot
artichoke
artichoke
beetroot
beetroot
carrot
root@lamp ~#
```

```
root@lamp ~# sort < biglist
-bash: biglist: No such file or directory
root@lamp ~# touch biglist
root@lamp ~# sort < biglist
root@lamp ~# cat biglist
root@lamp ~# sort < biglist > slist
root@lamp ~# cat slist
root@lamp ~# echo "carrot" >> biglist
root@lamp ~# echo "beetroot" >> biglist
root@lamp ~# echo "carrot" >> biglist
root@lamp ~# sort < biglist > slist
root@lamp ~# cat slist
beetroot
carrot
carrot
root@lamp ~#
```

3.4 Pipes

```
192.168.56.101 - PuTTY
faisal@lamp:~$ who
root     tty1         Jan  1 21:38
faisal   pts/0        Jan  1 21:40 (192.168.56.1)
faisal@lamp:~$
```

```
faisal@lamp:~$ who > names.txt
faisal@lamp:~$ sort < names.txt
faisal   pts/0        Jan  1 21:40 (192.168.56.1)
root     tty1         Jan  1 21:38
faisal@lamp:~$
```

```
faisal@lamp:~$ who | sort
faisal   pts/0        Jan  1 21:40 (192.168.56.1)
root     tty1         Jan  1 21:38
faisal@lamp:~$
```

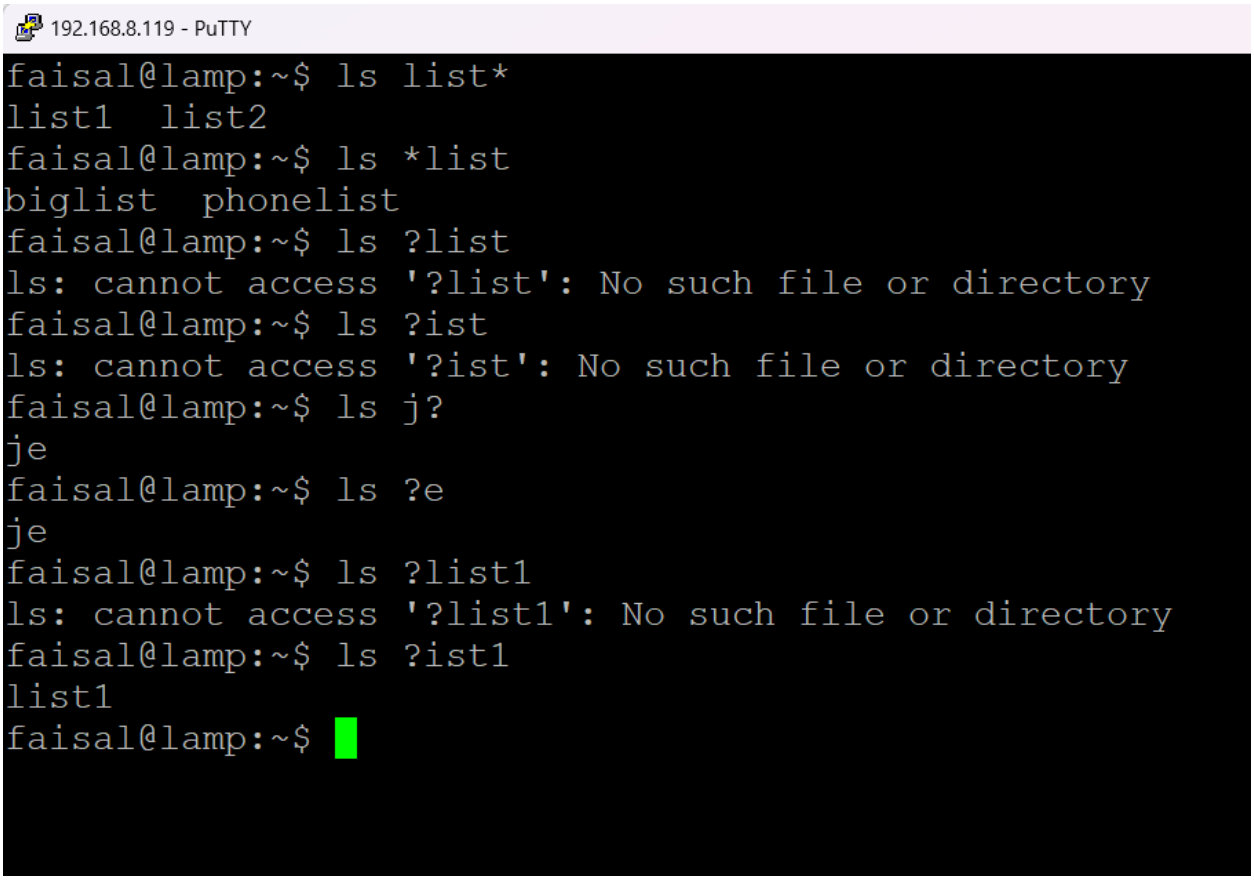
```
faisal@lamp:~$ who | wc -l
2
faisal@lamp:~$
```

Exercise 3b

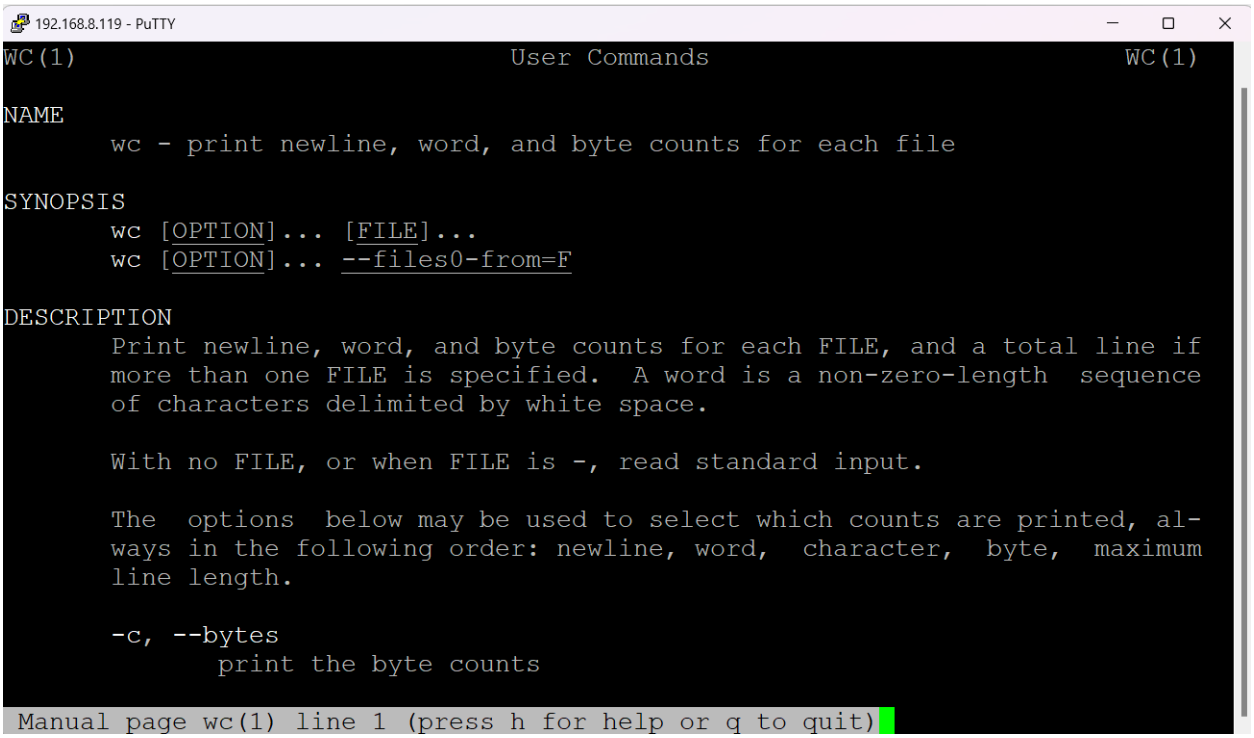
192.168.8.119 - PuTTY

```
faisal@lamp:~$ cat list1 list2 | grep p | sort | a2ps -Phockney
[stdin (plain): 1 page on 1 sheet]
/usr/bin/a2ps-lpr-wrapper: lp/lpr/rlpr missing!
[Total: 1 page on 1 sheet] sent to the printer `hockney'
faisal@lamp:~$
```

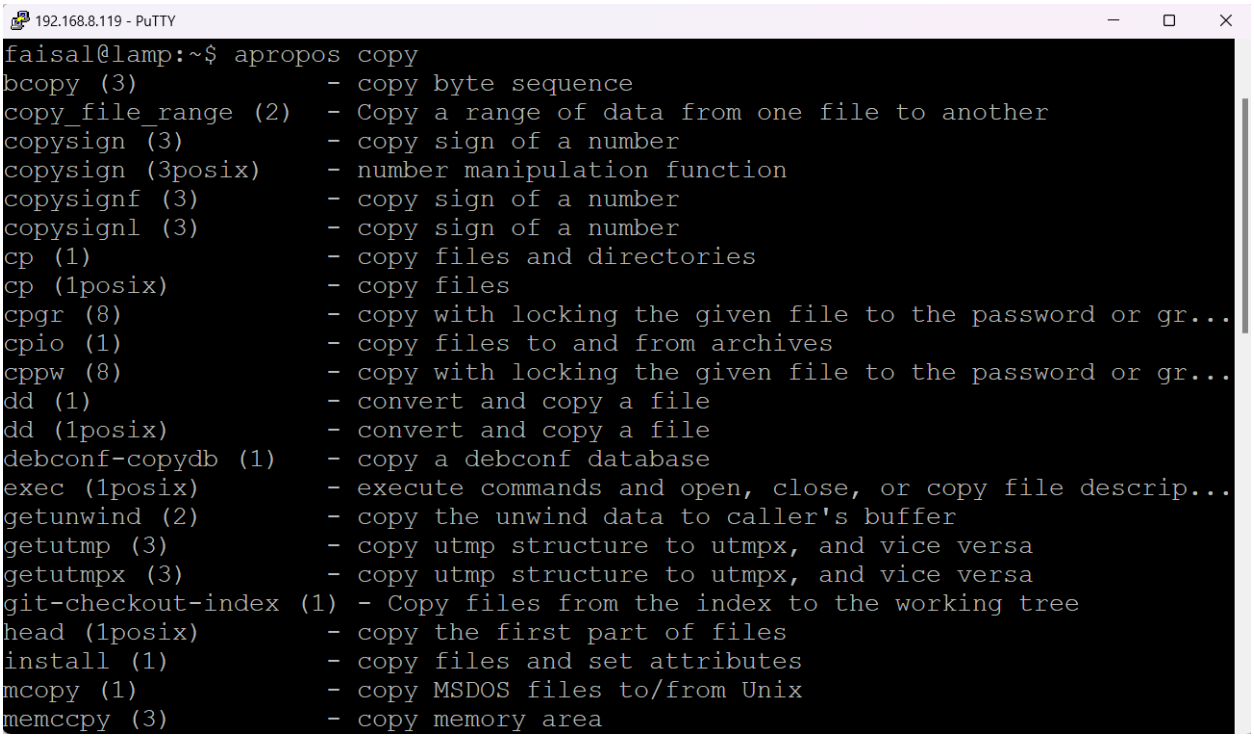
4.1 Wildcards



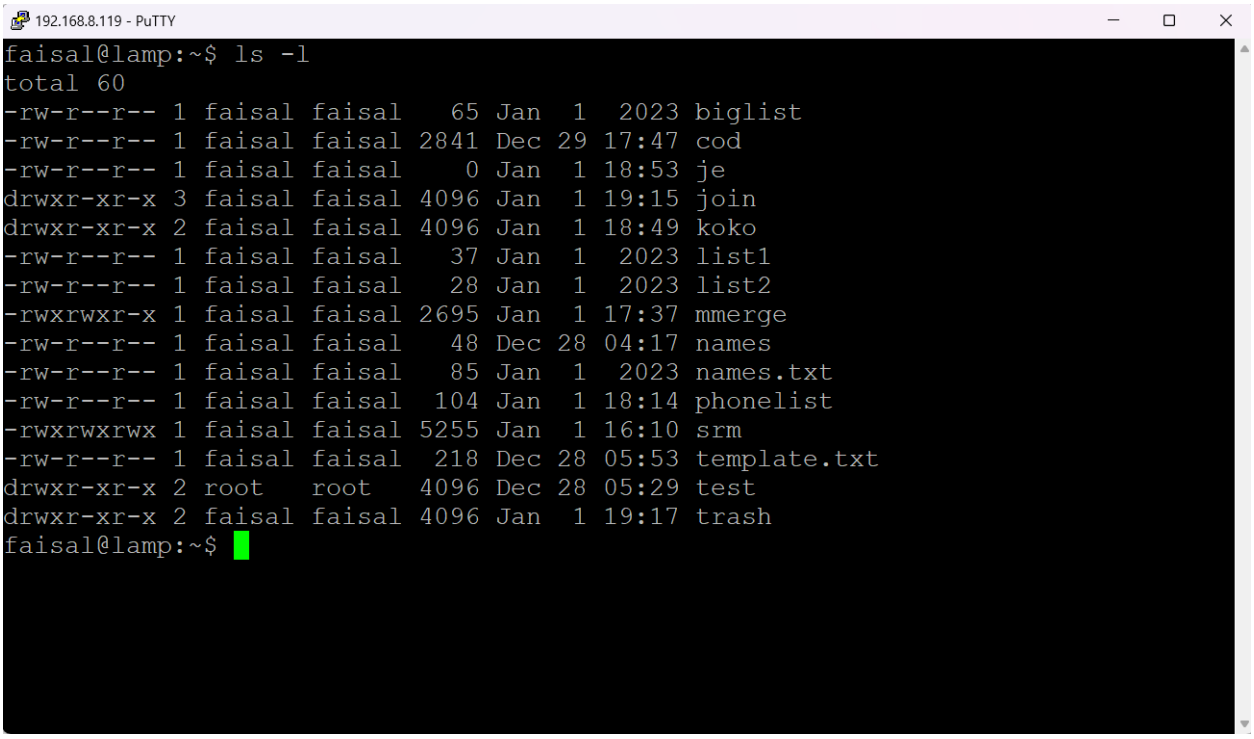
4.3 Getting Help



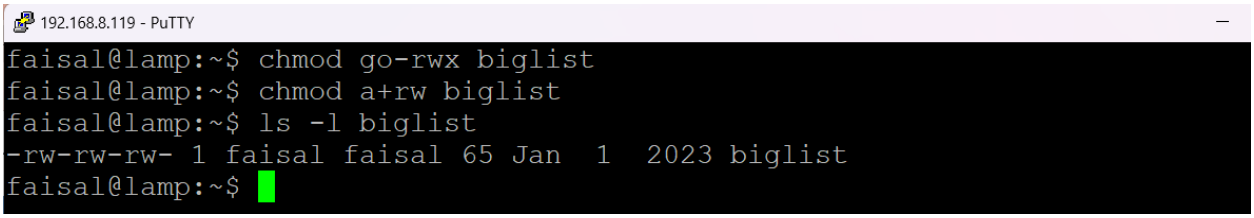

```
faisal@lamp:~$ whatis wc
wc (1)               - print newline, word, and byte counts for each file
wc (1posix)          - word, line, and byte or character count
```



5.1 File system security (access rights)



5.2 Changing access rights



Exercise 5a

```
faisal@lamp:~$ touch science.txt
faisal@lamp:~$ ls -l science.txt
-rw-r--r-- 1 faisal faisal 0 Jan  1 19:53 science.txt
faisal@lamp:~$ chmod a-rwx science.txt
faisal@lamp:~$ ls -l science.txt
---------- 1 faisal faisal 0 Jan  1 19:53 science.txt
faisal@lamp:~$ chmod ug+rwx science.txt
faisal@lamp:~$ ls -l science.txt
-rwxrwx--- 1 faisal faisal 0 Jan  1 19:53 science.txt
faisal@lamp:~$
```

```
faisal@lamp:~$ ls -l
total 64
drwxr-xr-x 2 faisal faisal 4096 Jan  1 19:55 backups
```

Chmod u+rw backups

```
faisal@lamp:~$ ls -l
total 64
drw------- 2 faisal faisal 4096 Jan  1 19:55 backups
```

5.3 Processes and Jobs

192.168.8.119 - PuTTY

```
faisal@lamp:~$ ps
  PID TTY          TIME CMD
 1778 pts/0    00:00:00 bash
 1934 pts/0    00:00:00 ps
faisal@lamp:~$
```

192.168.8.119 - PuTTY

```
faisal@lamp:~$ ps
  PID TTY          TIME CMD
 1778 pts/0    00:00:00 bash
 1934 pts/0    00:00:00 ps
faisal@lamp:~$ sleep 10
```

```
faisal@lamp:~$ sleep 10 &
[1] 1936
faisal@lamp:~$
```

192.168.8.119 - PuTTY

```
faisal@lamp:~$ sleep 100
^Z
[2]+  Stopped                 sleep 100
faisal@lamp:~$ bg
[2]+ sleep 100 &
faisal@lamp:~$
```

5.4 Listing suspended and background processes

192.168.8.119 - PuTTY

```
faisal@lamp:~$ jobs
[2]+  Running                 sleep 100 &
faisal@lamp:~$ fg 2
sleep 100
```

5.5 Killing a process

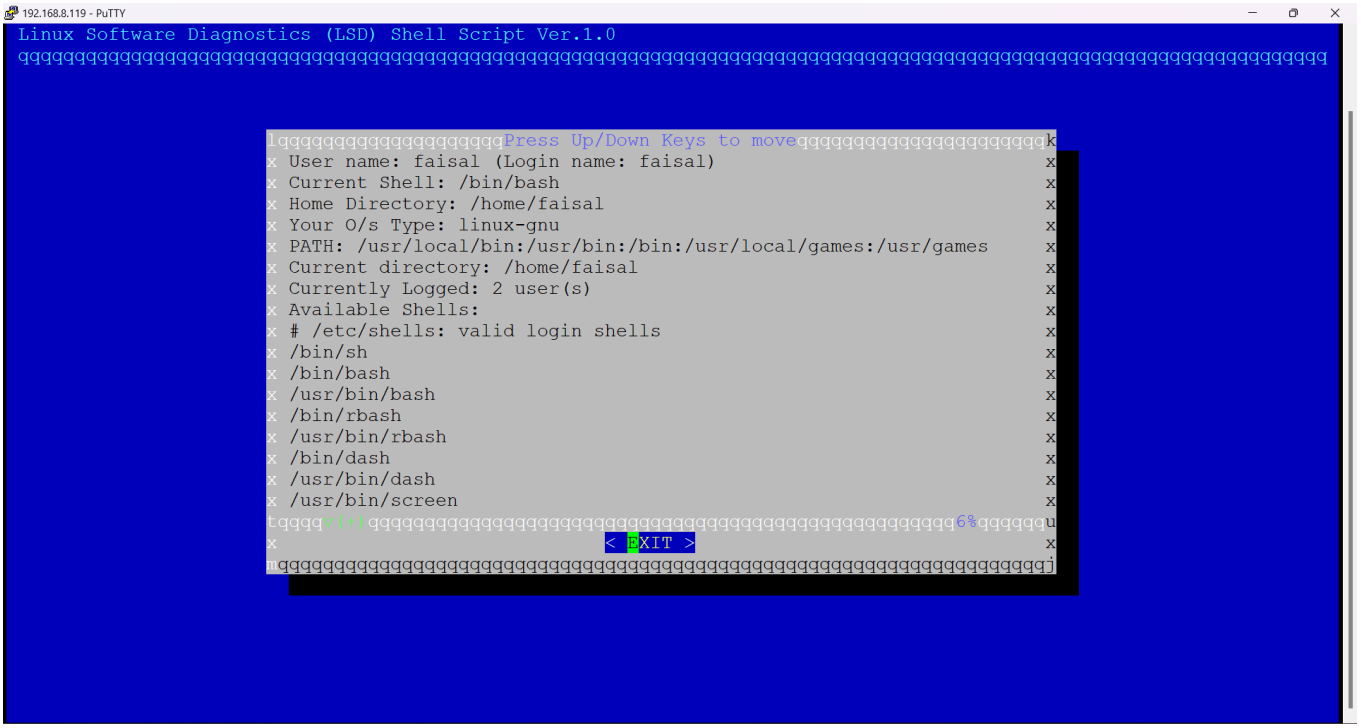
192.168.8.119 - PuTTY

```
faisal@lamp:~$ sleep 100
^C
faisal@lamp:~$ sleep 100 &
[1] 2099
faisal@lamp:~$ jobs
[1]+  Running                 sleep 100 &
faisal@lamp:~$ kill 1
-bash: kill: (1) - Operation not permitted
faisal@lamp:~$ sudo kill 1
faisal@lamp:~$ jobs
[1]+  Running                 sleep 100 &
faisal@lamp:~$ kill 2099
faisal@lamp:~$ jobs
[1]+  Terminated              sleep 100
faisal@lamp:~$
```

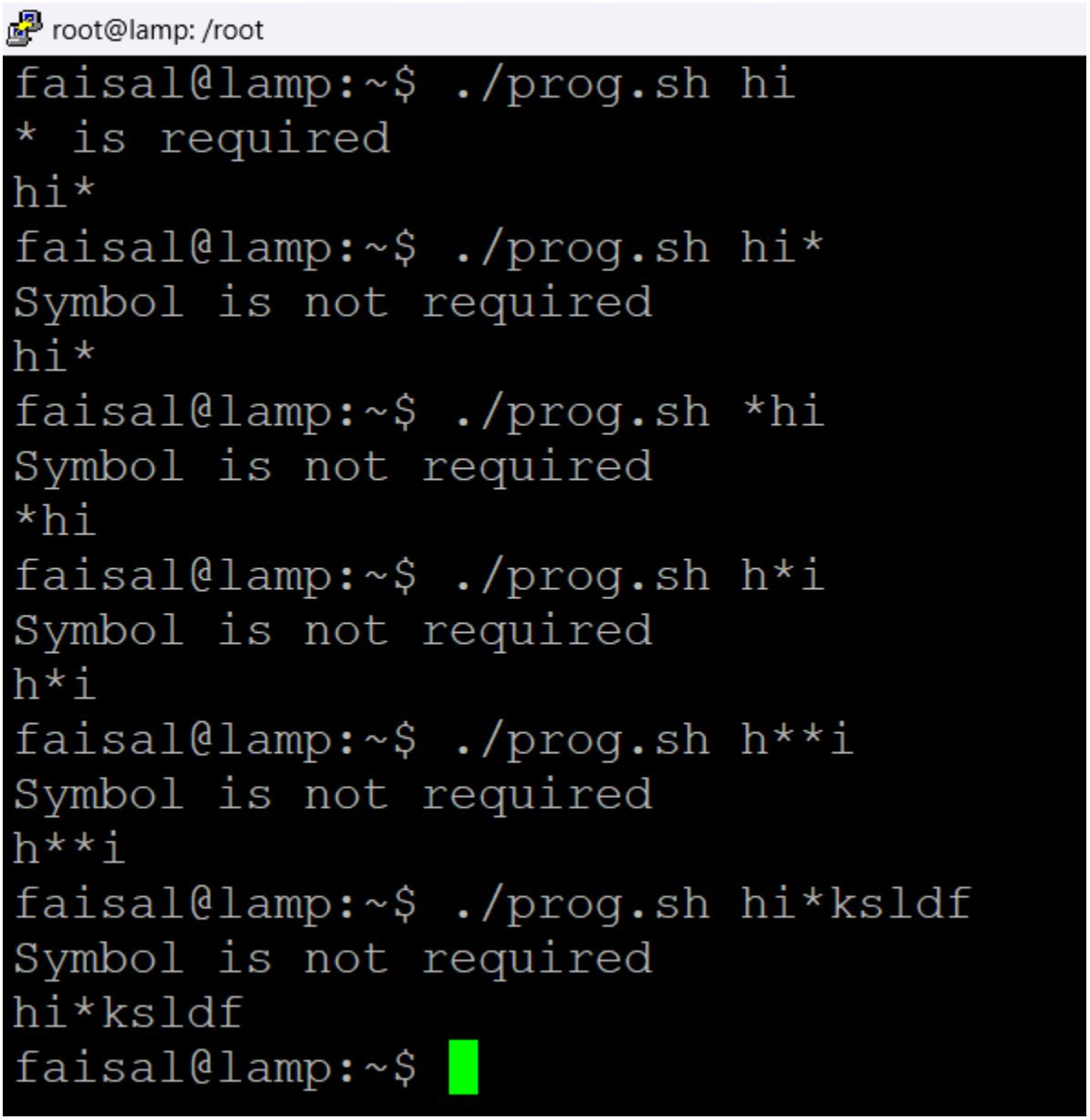
192.168.8.119 - PuTTY

```
faisal@lamp:~$ sleep 100 &
[1] 2130
faisal@lamp:~$ ps
  PID TTY          TIME CMD
 1778 pts/0    00:00:00 bash
 2130 pts/0    00:00:00 sleep
 2131 pts/0    00:00:00 ps
faisal@lamp:~$ kill 2130
faisal@lamp:~$ ps
  PID TTY          TIME CMD
 1778 pts/0    00:00:00 bash
 2132 pts/0    00:00:00 ps
[1]+  Terminated              sleep 100
faisal@lamp:~$ kill -9 2130
-bash: kill: (2130) - No such process
faisal@lamp:~$
```

Shell Script Programming Example:



A Shell Script Exercise:



As seen from the tests the program works as required