



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



EE463 – Operating Systems

LAB #2

Tutorials on the Unix Shell & vim editor

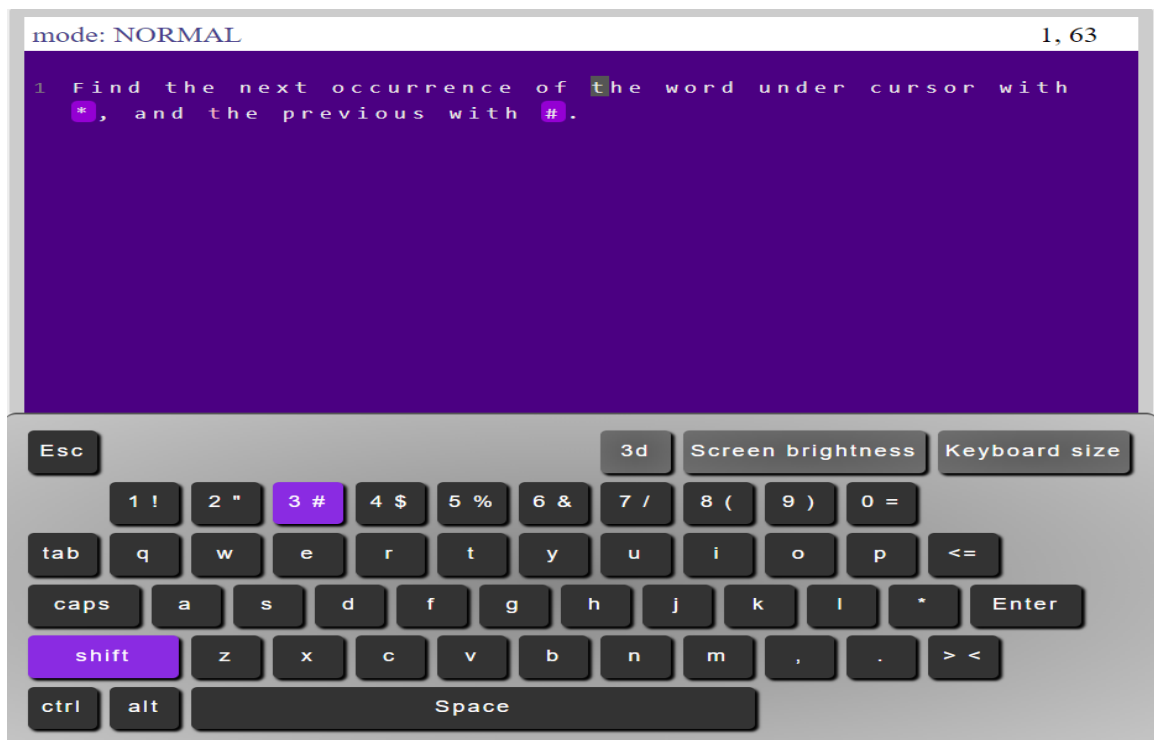
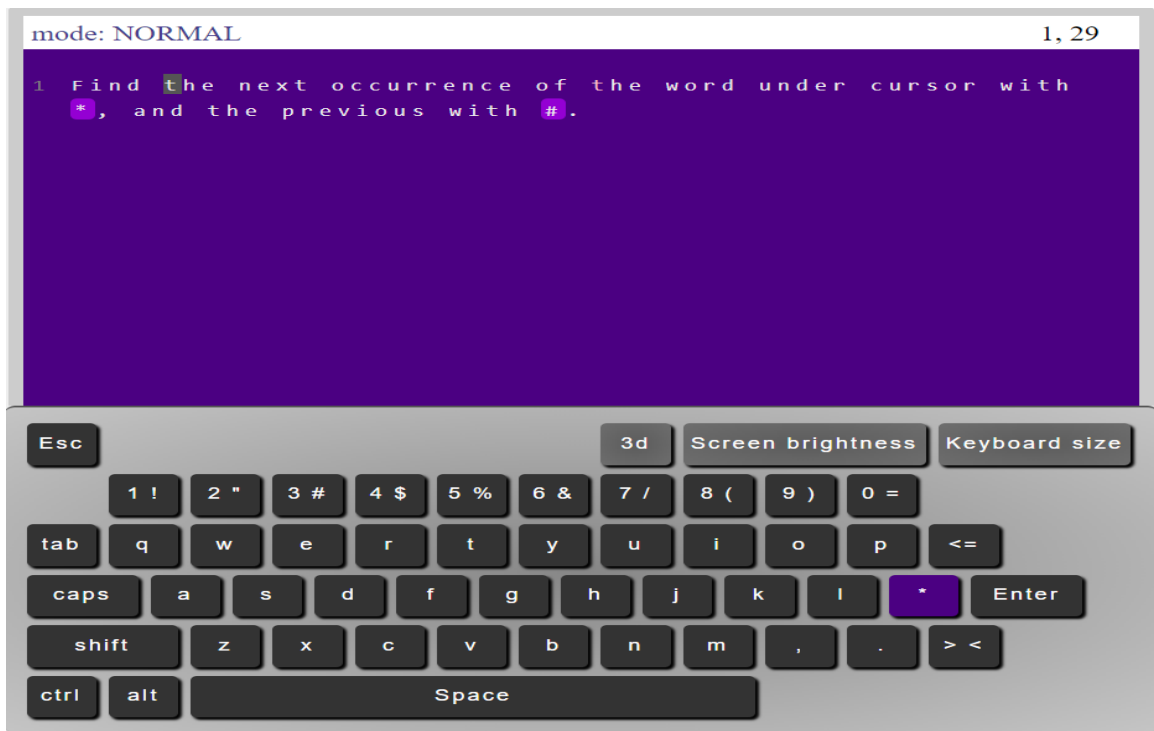
Student Name	ID	Submission Date
Faisal Abushanab	1945603	2023/1/1

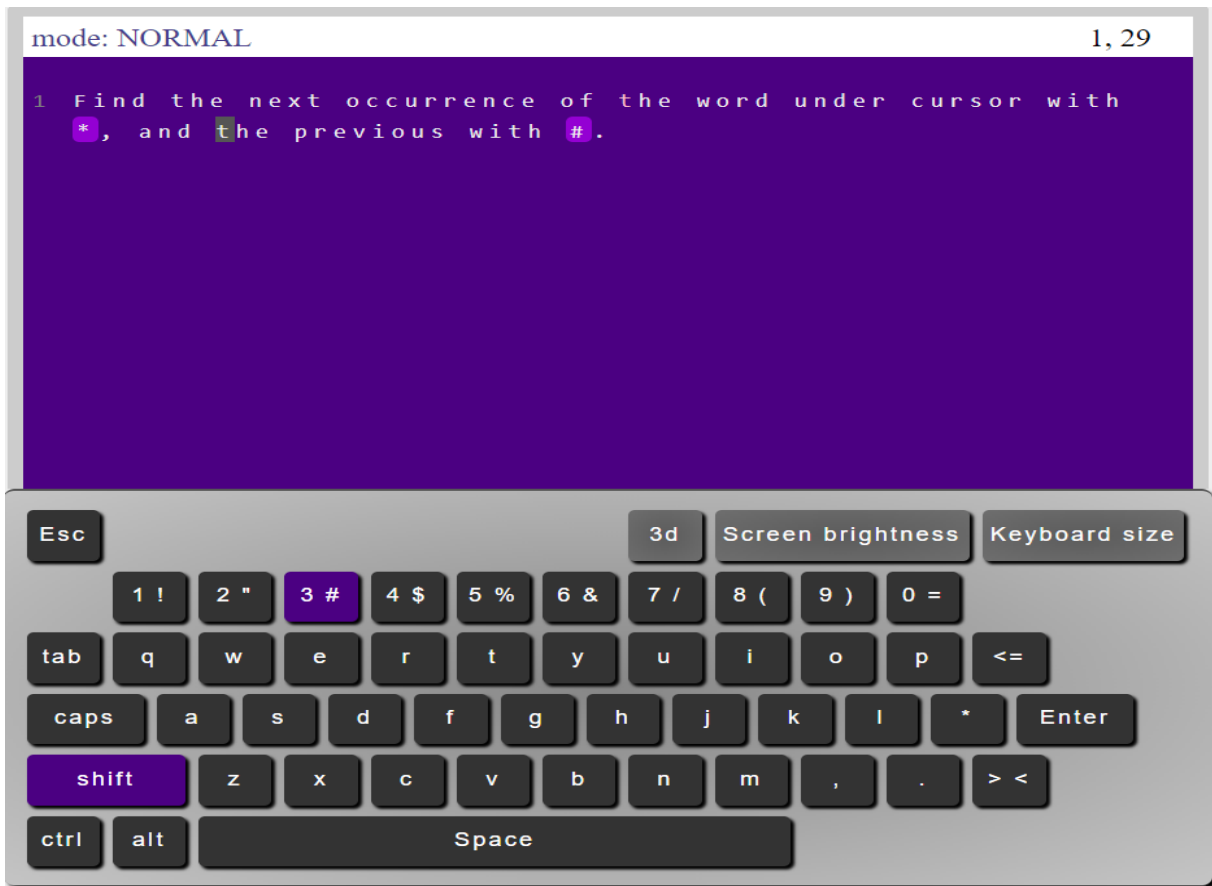
Instructor: Dr. A. M. Al-Qasimi

Eng. Turki Gary

The vim Text Editor:

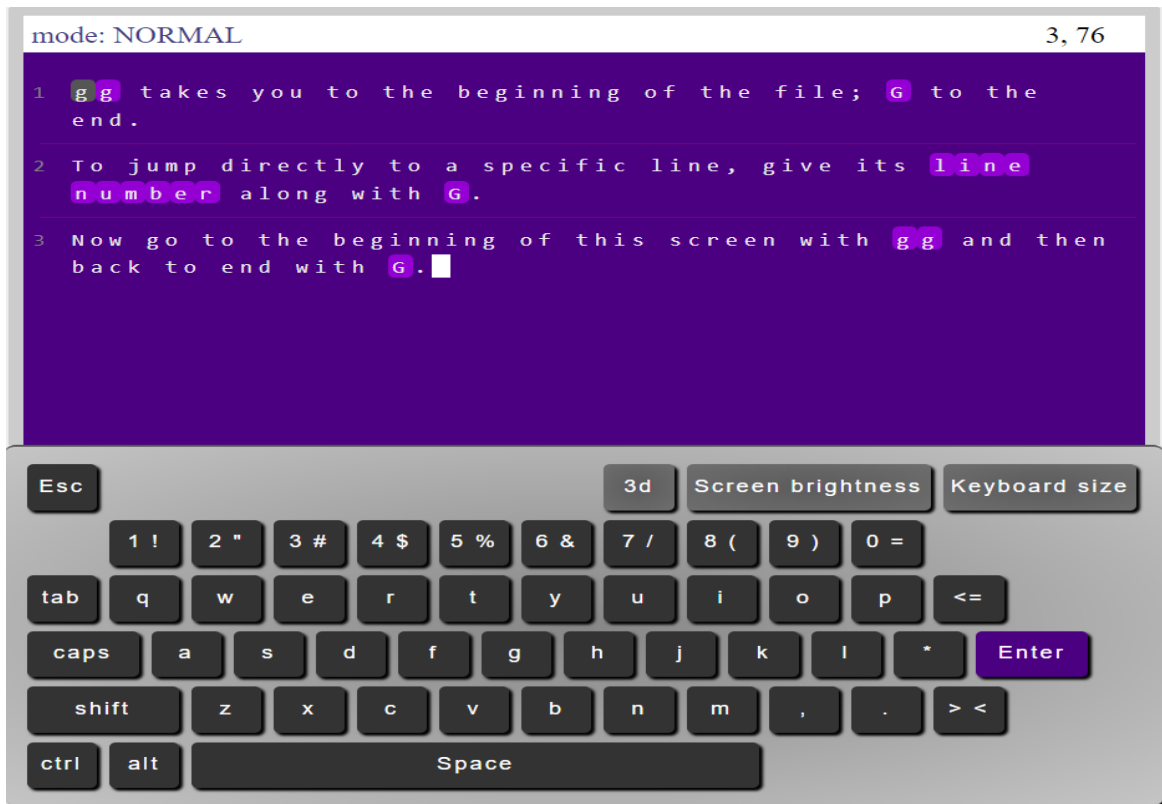
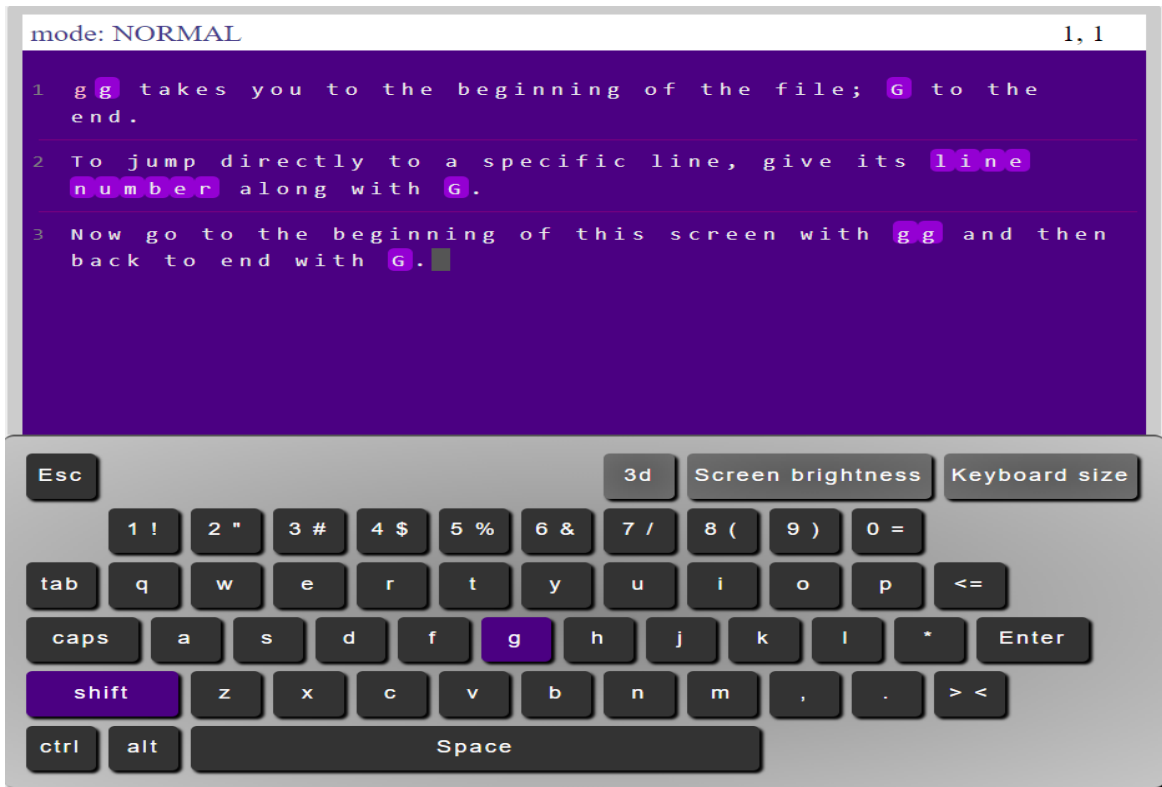
10. Find word under cursor, * and #)

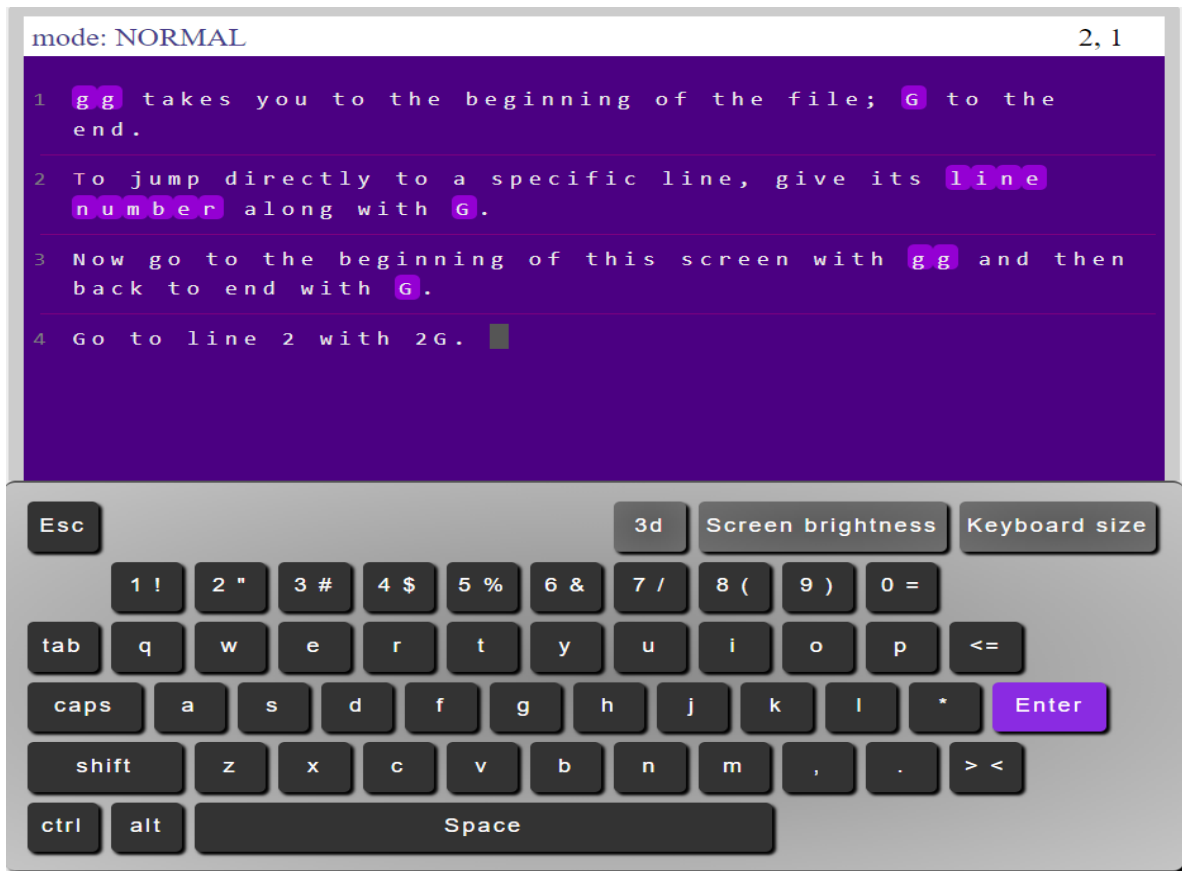




To find the next occurrence of the word under the curser we use the “*” button, while finding the previous occurrence is done by the “#” button

11. Goto line, g and G)

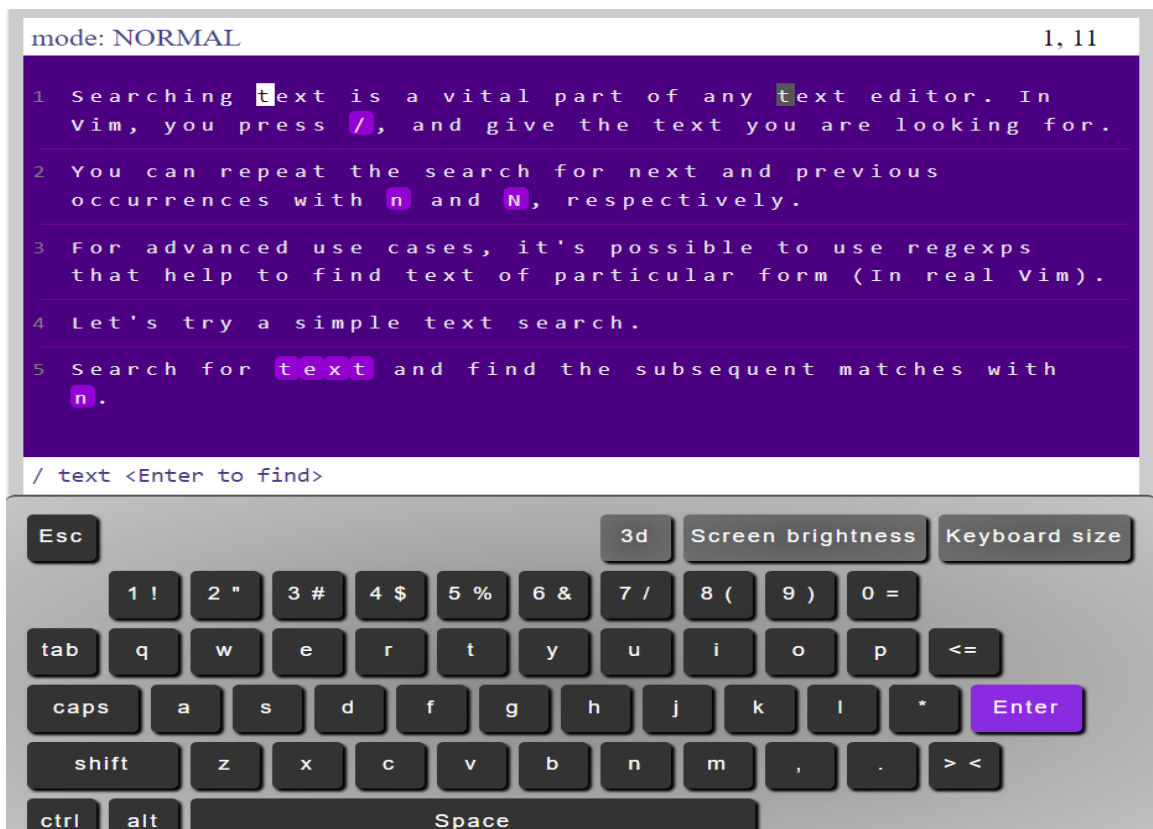




Use gg command to go to the beginning of the file, while using G command will put the cursor into the end of the file

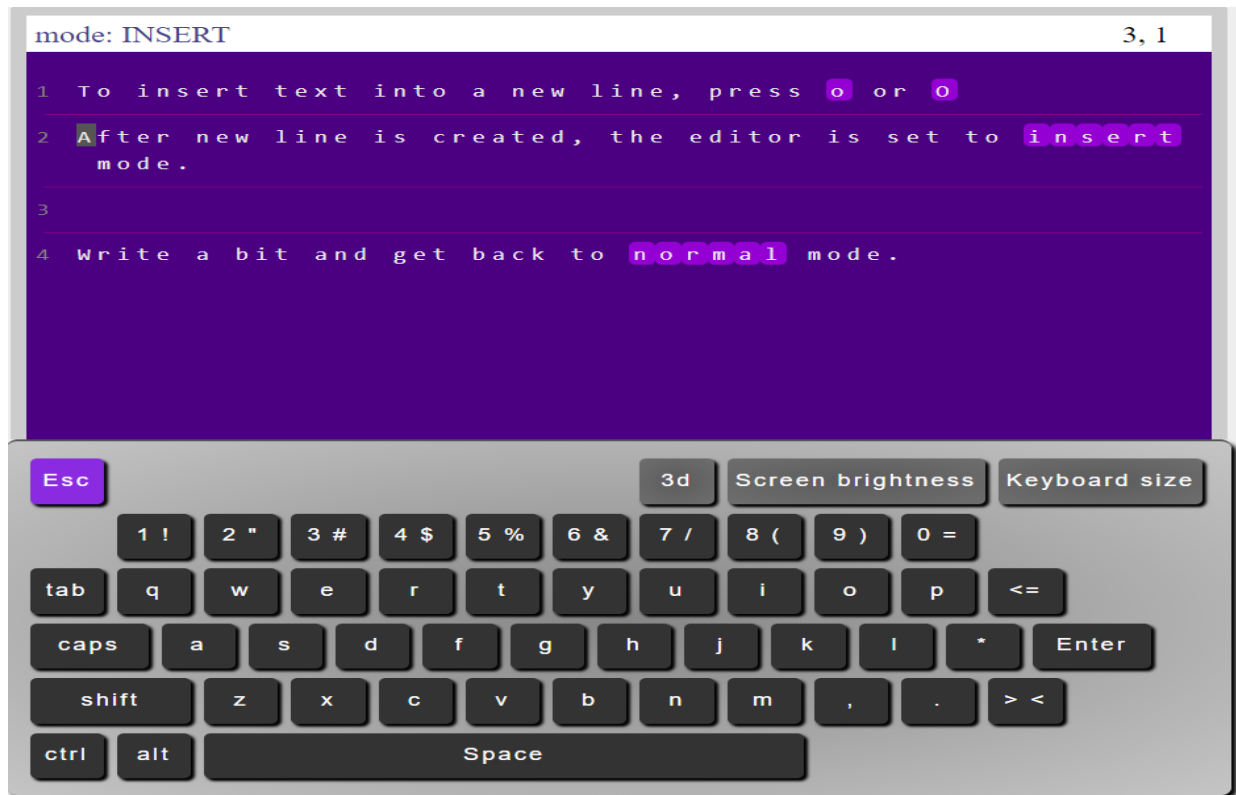
When you want to go to specific line you can type line number followed by G

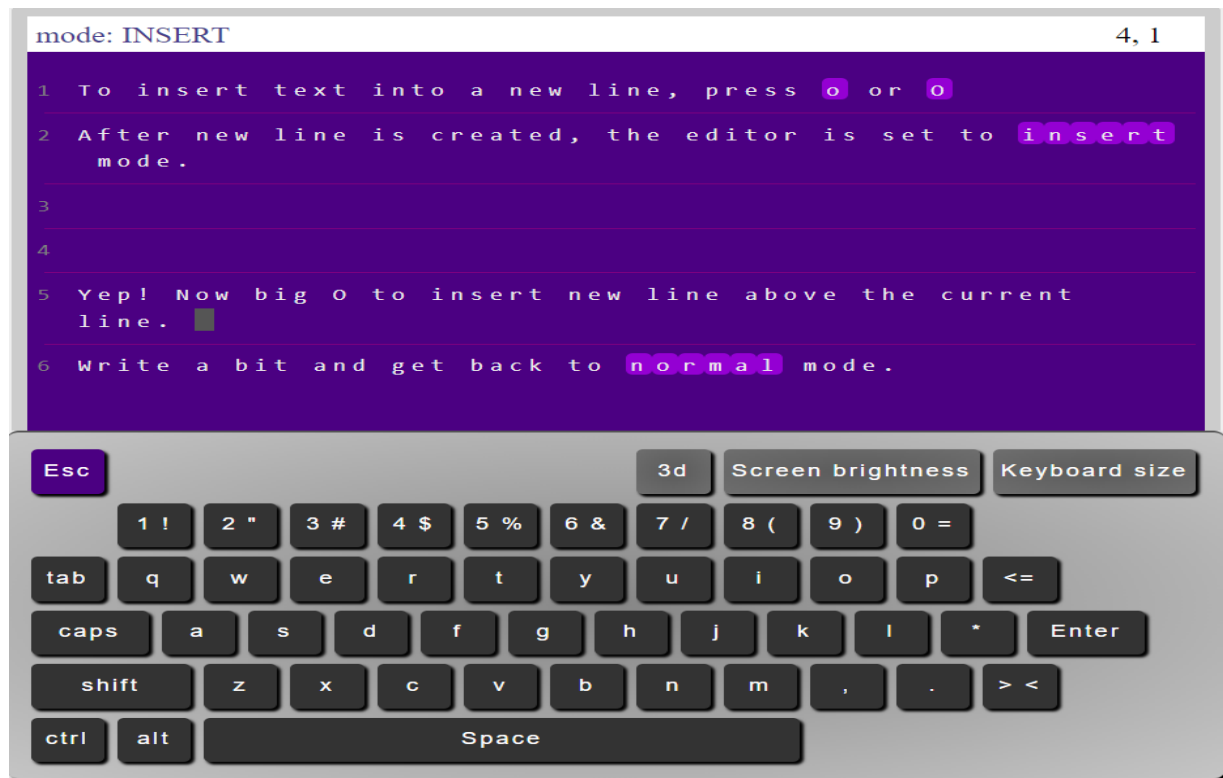
12. Search, /text with n and N)



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

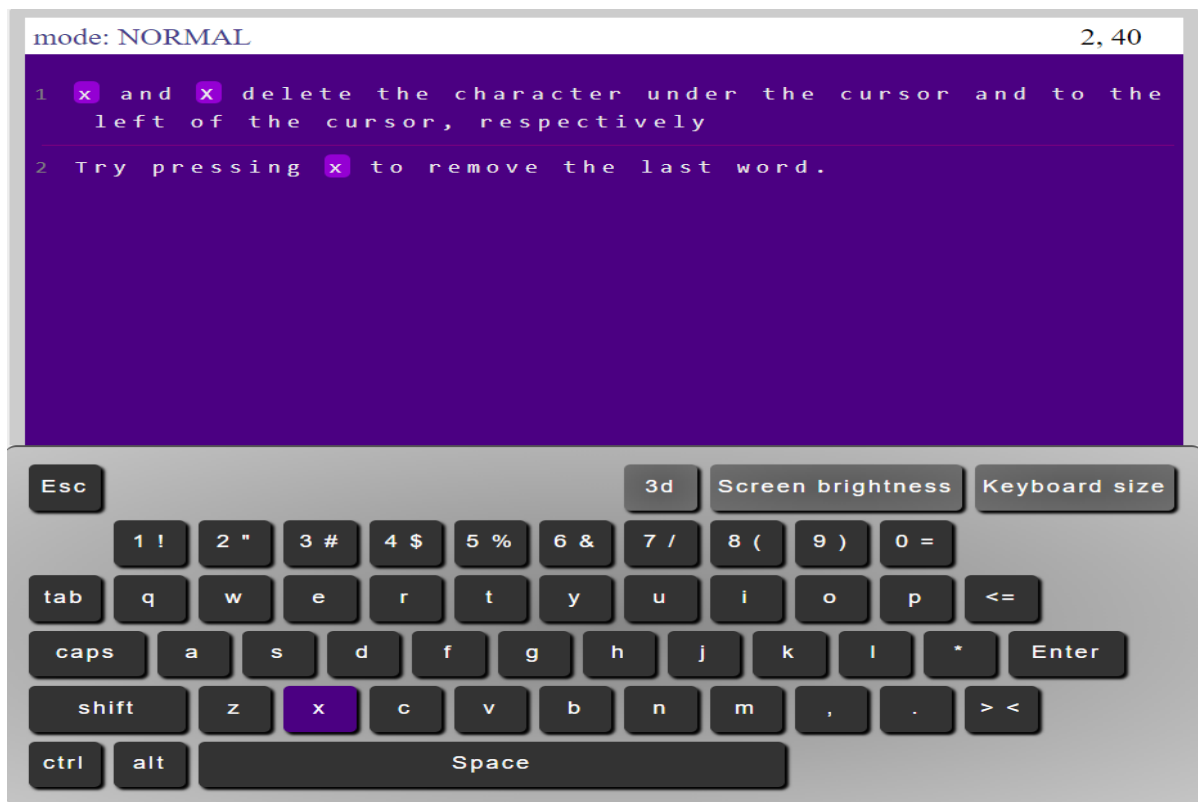
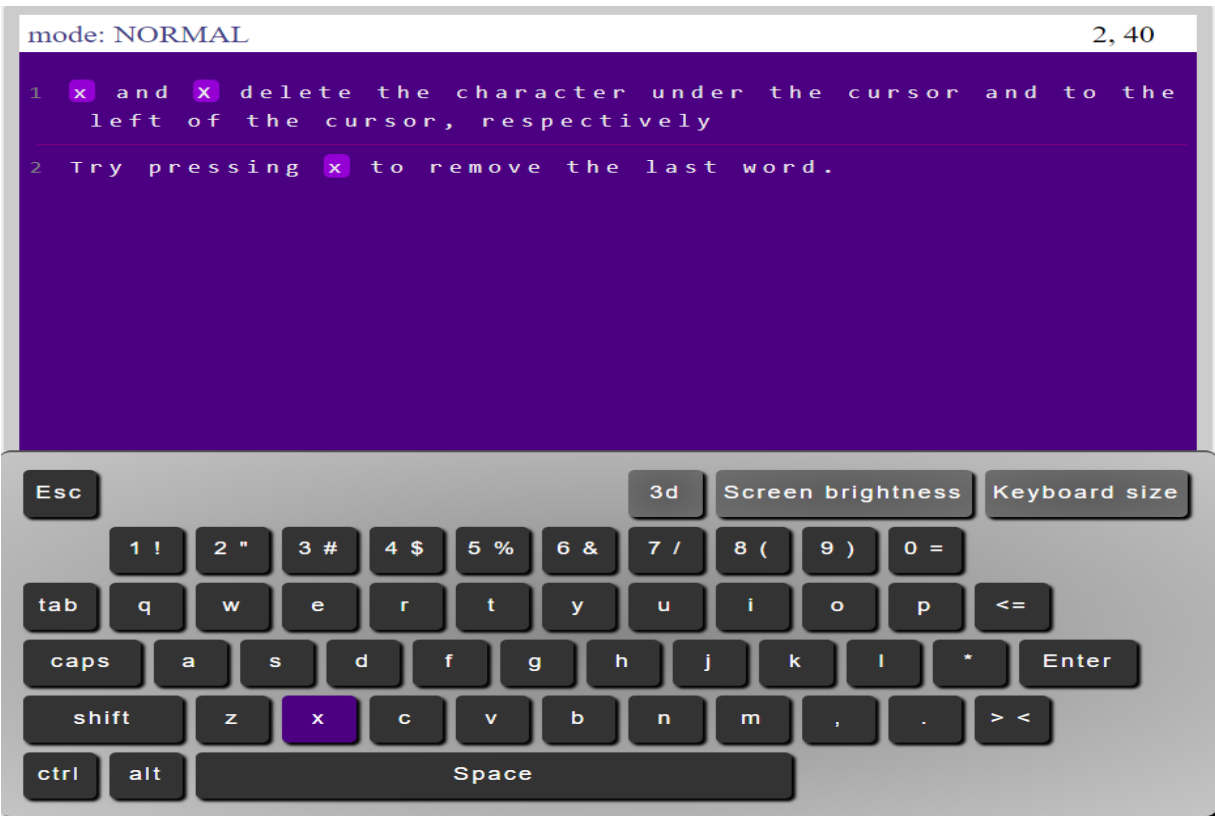
13. Insert new line, o and O)





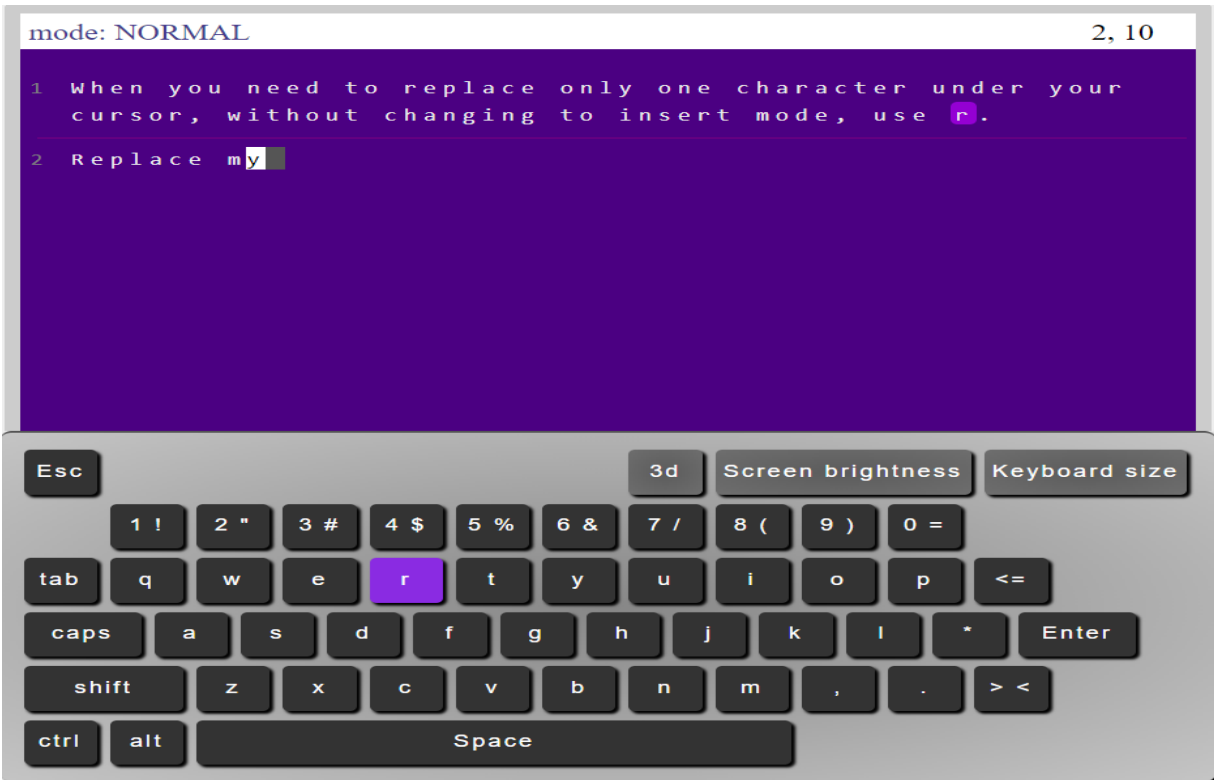
When you want to insert new line press the o button or O which will append a new line and switch to insert mode.

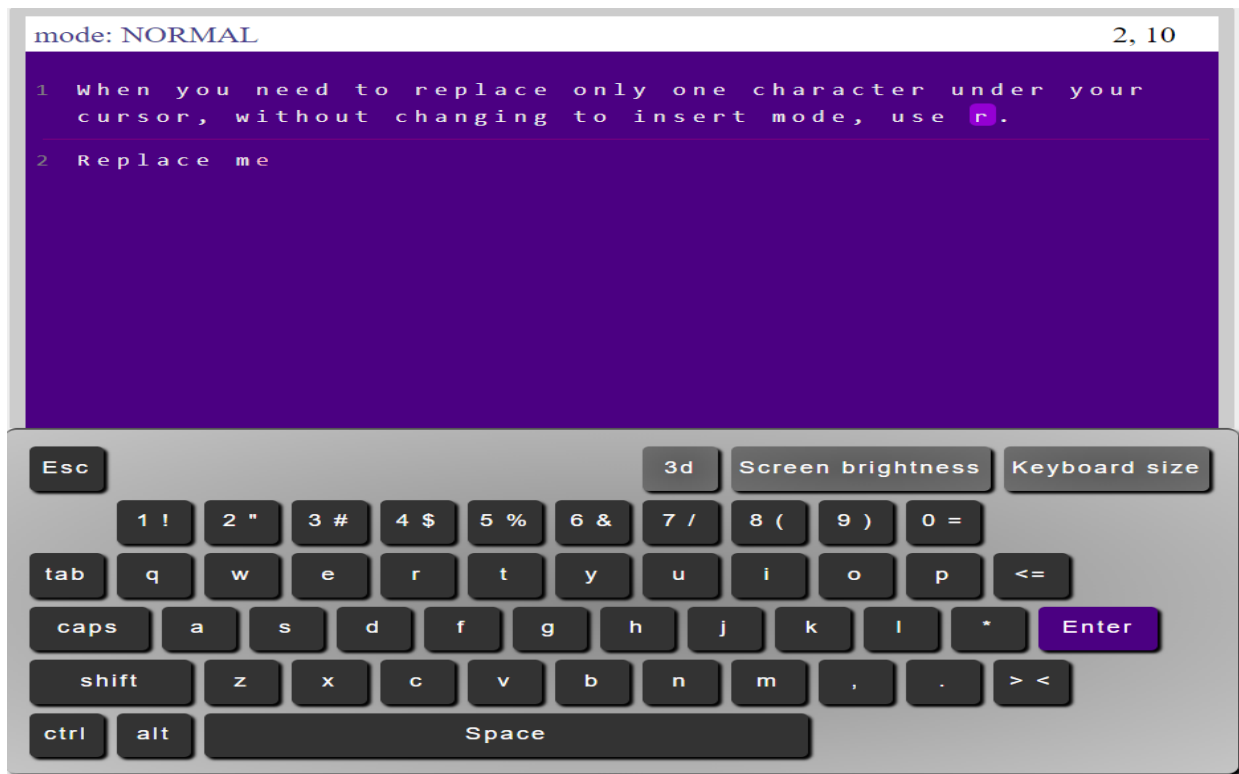
14. Removing a character, x and X)



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

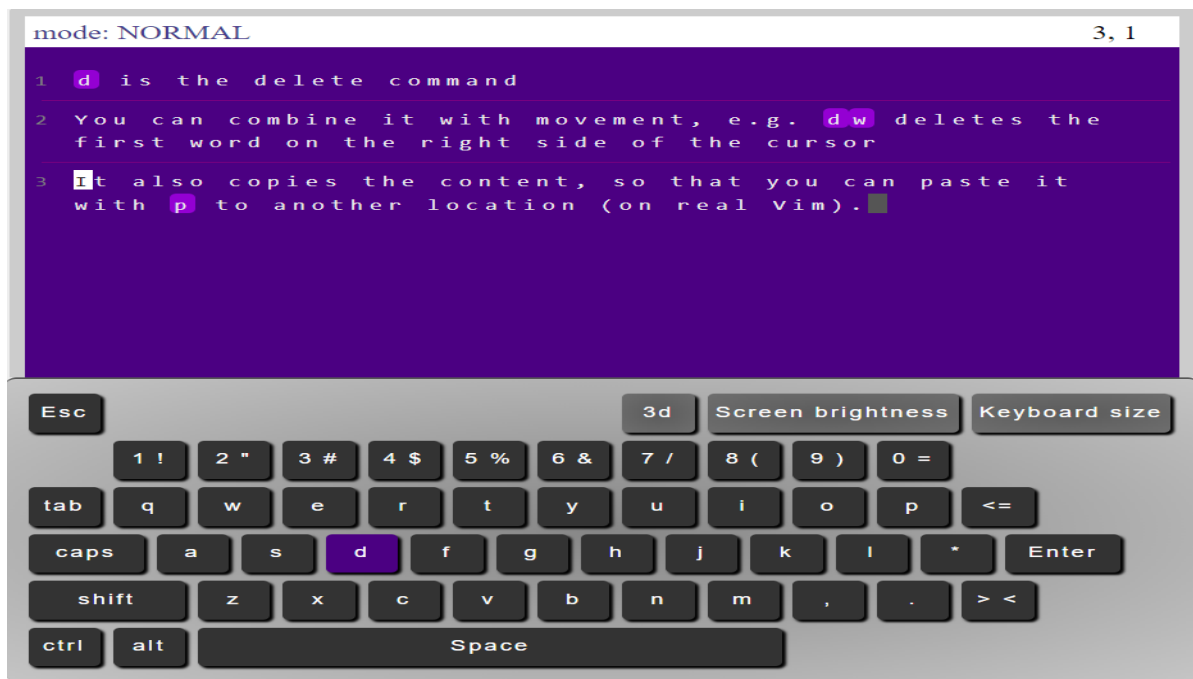
15. Replacing letter under cursor, r)

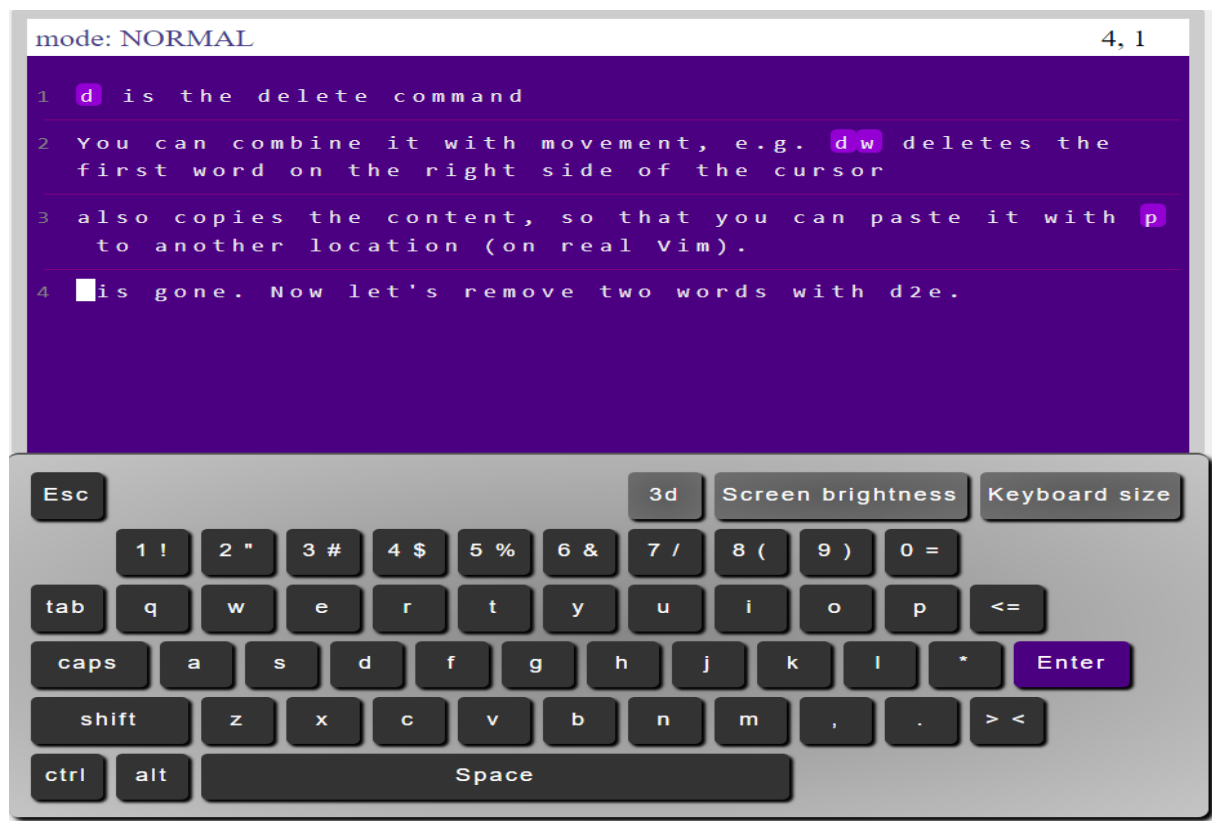
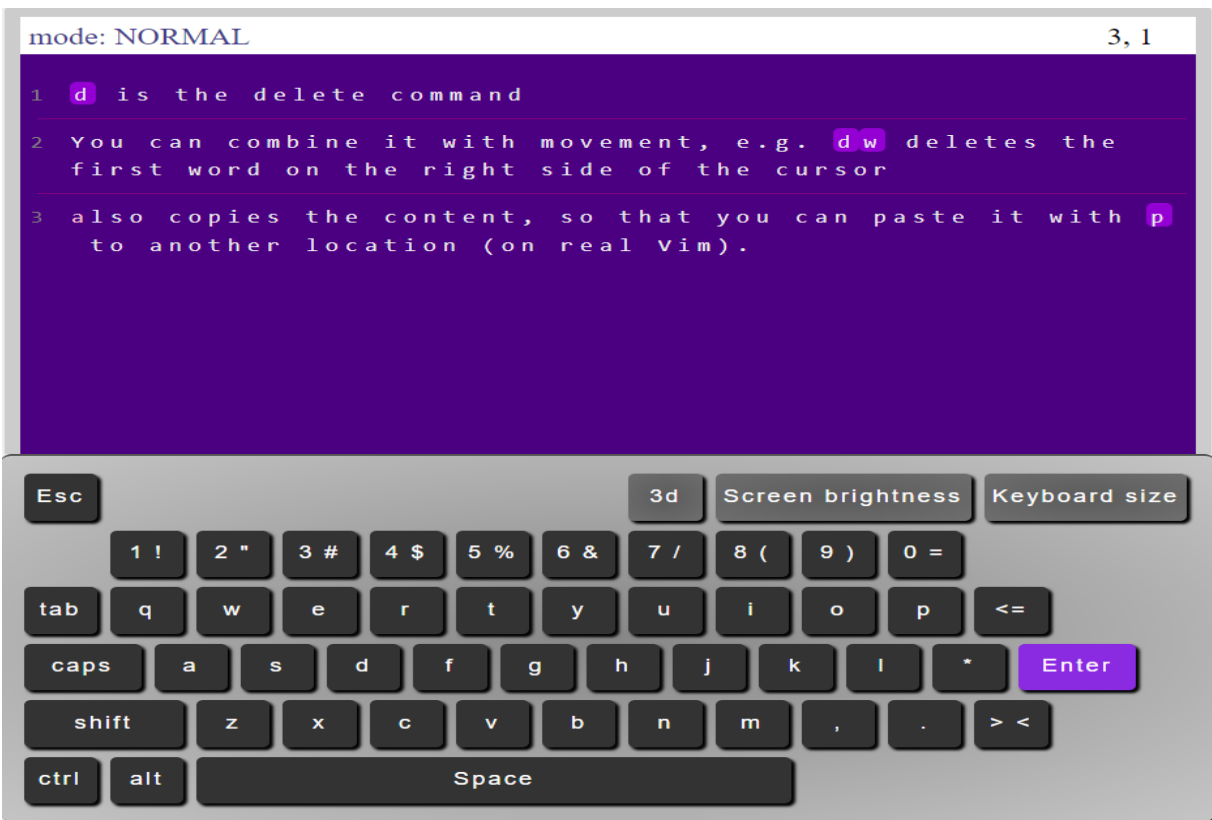




If you want to replace the character under the cursor, just press `r` then the letter to replace.

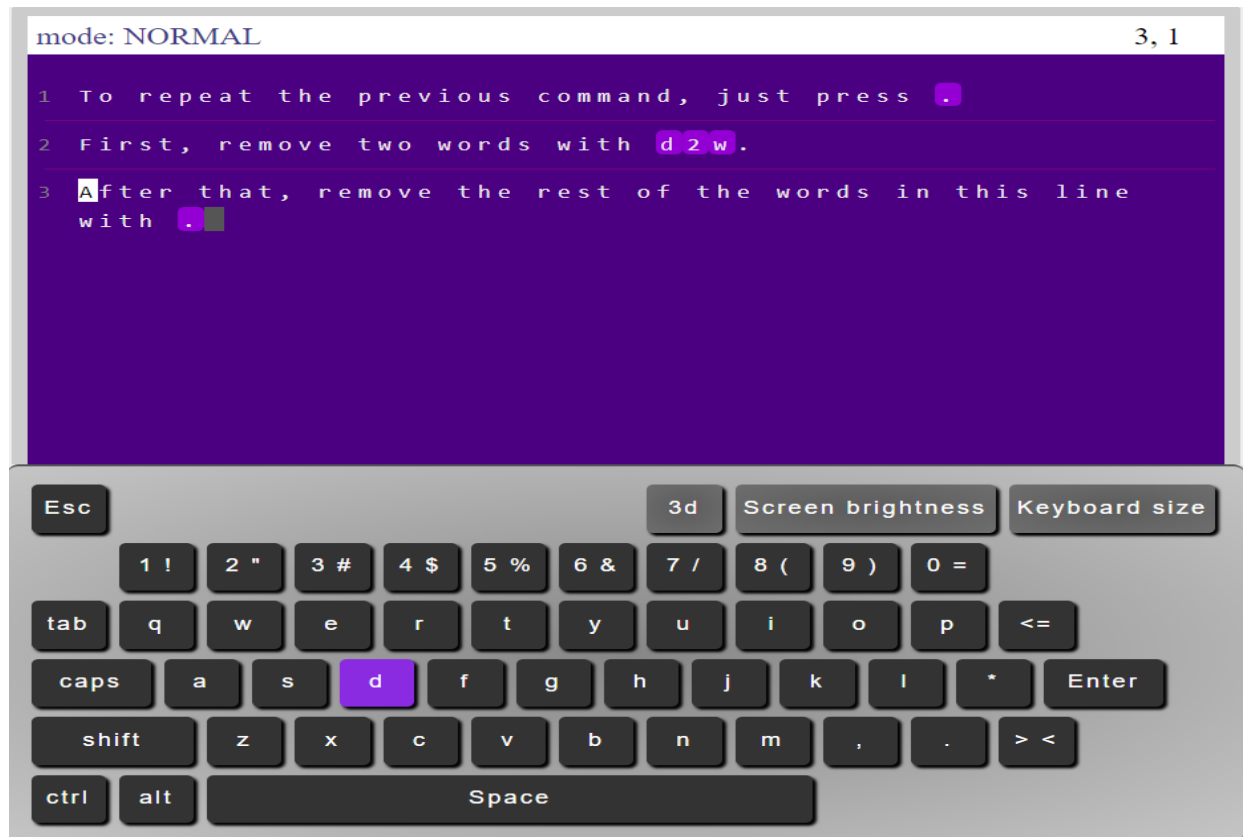
16. Deleting, `d`)

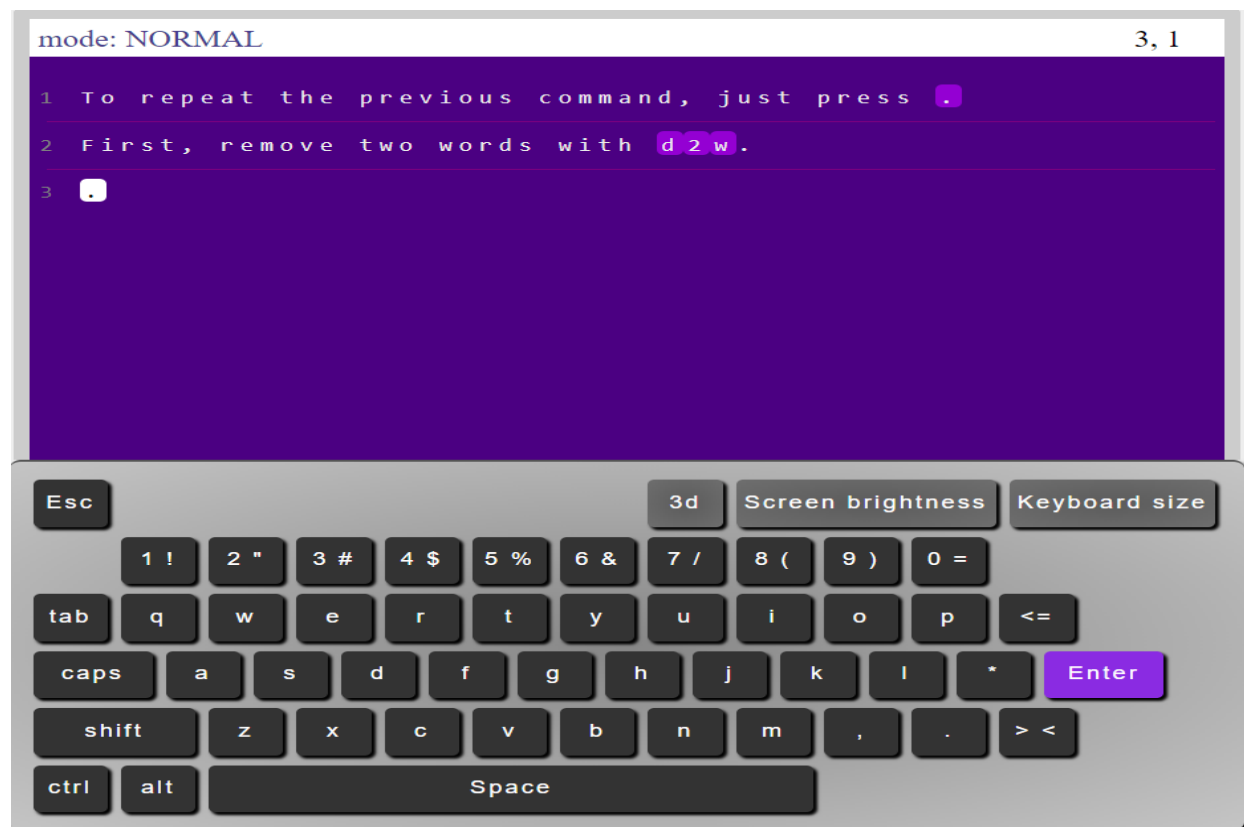




In order to delete a word just press d then w, if you want to delete more than one word just press dne; where n is the number of words you want to delete

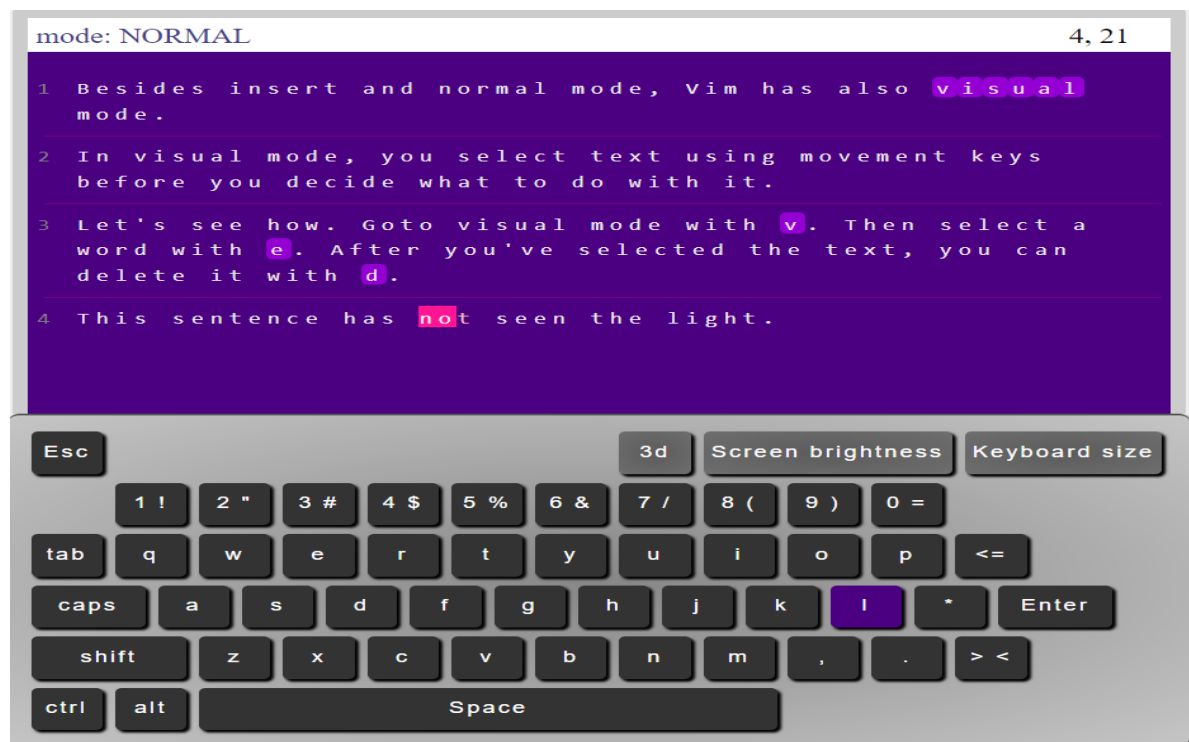
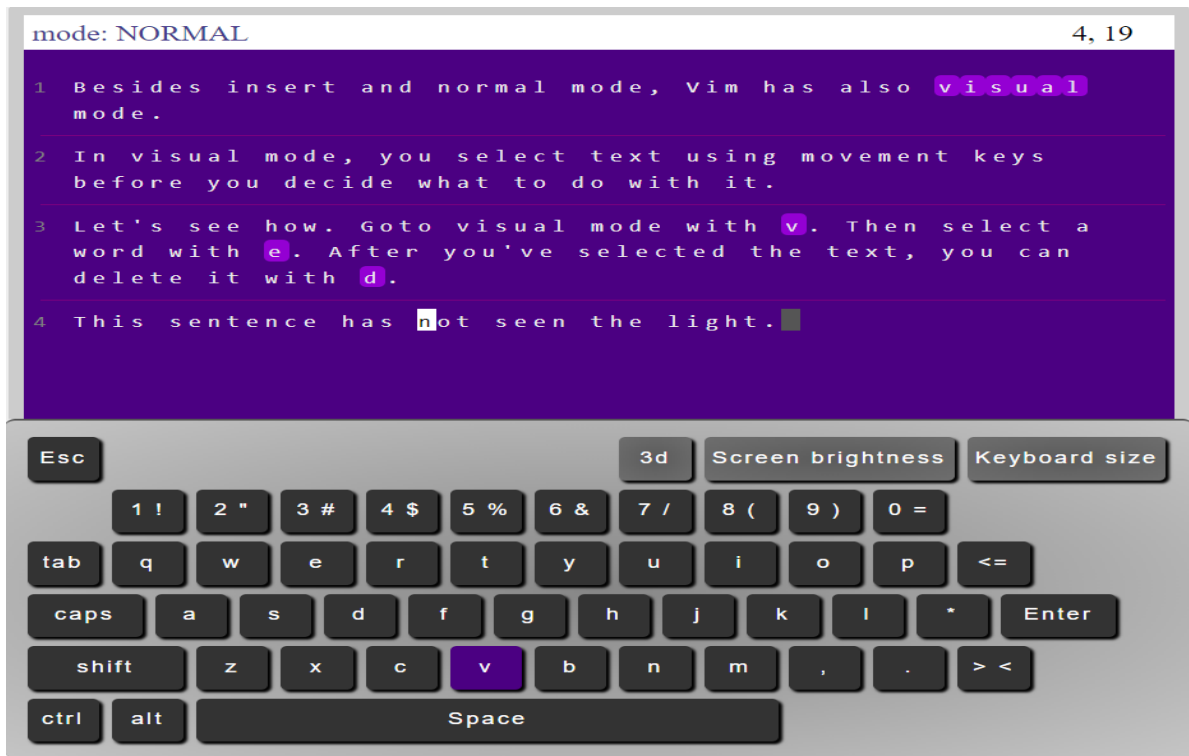
17. Repetition with .)

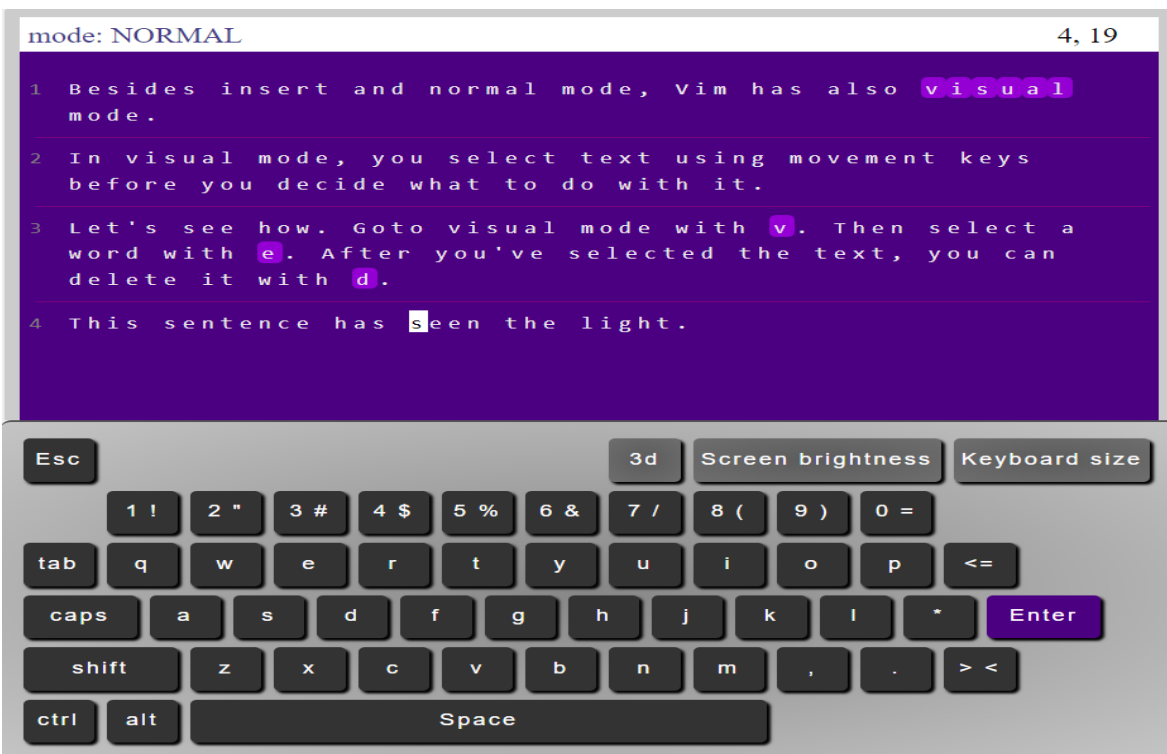
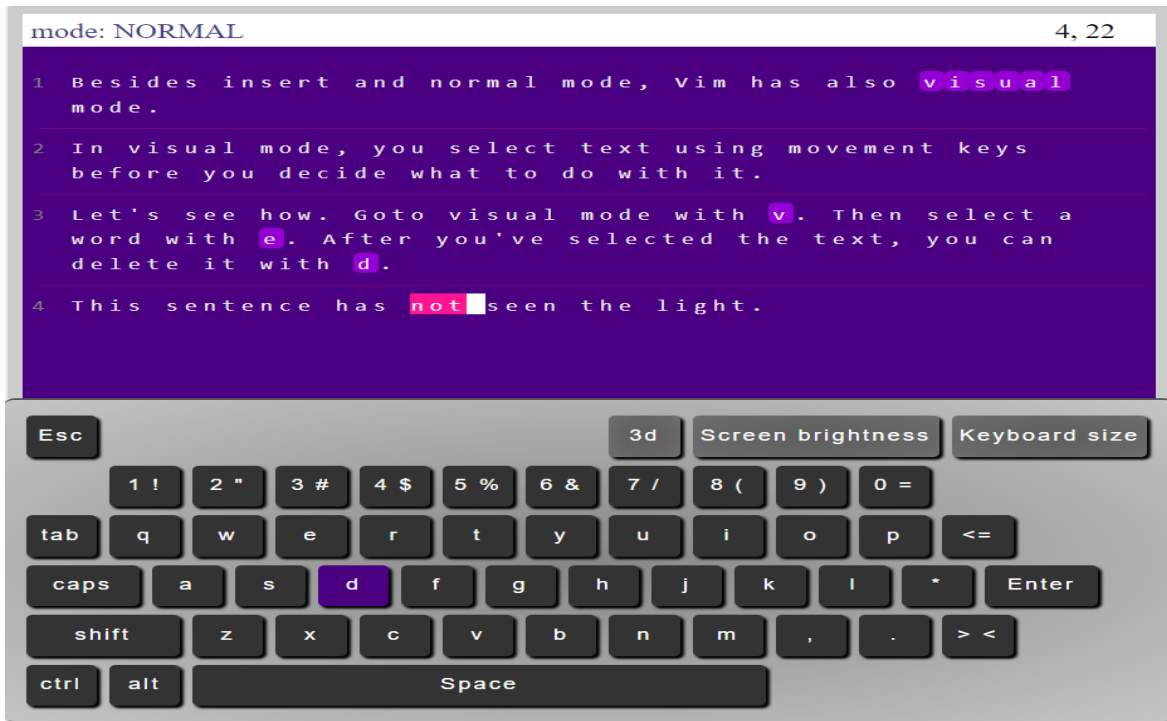




To repeat the previous command just press “.” Button.

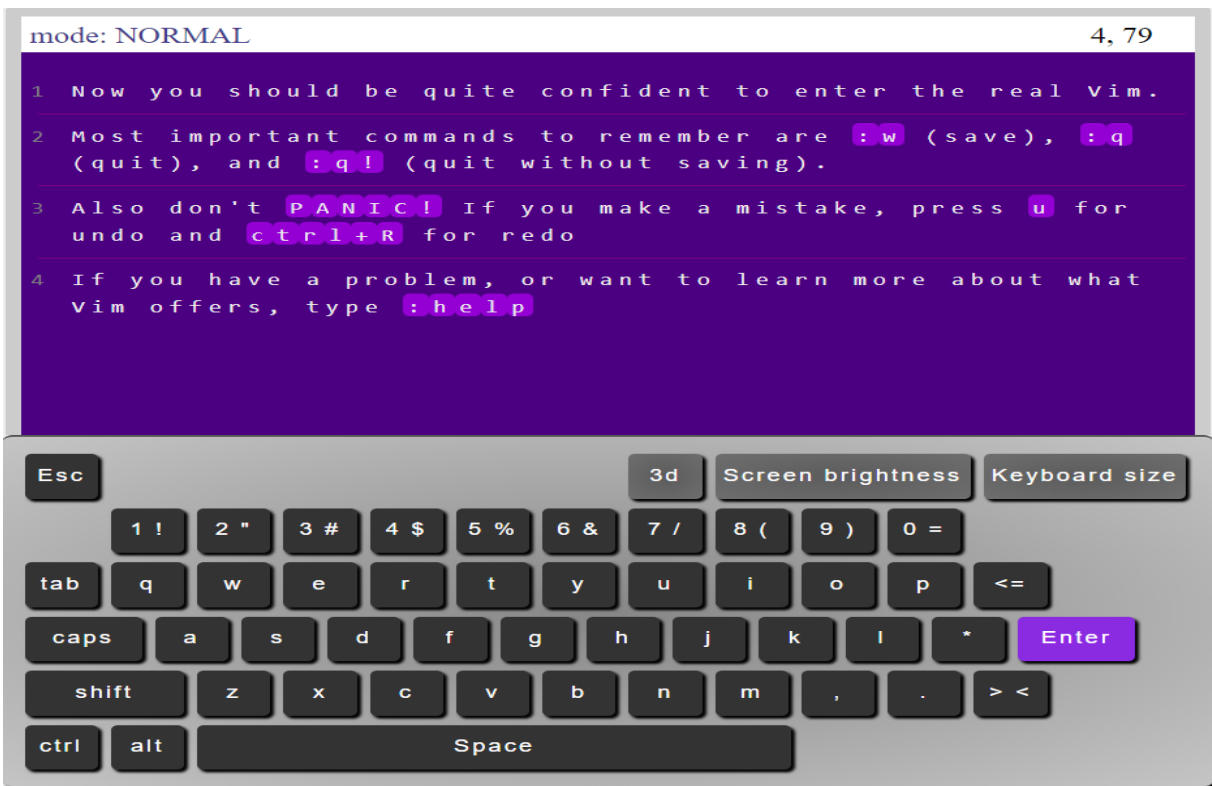
18. Visual mode, v)





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

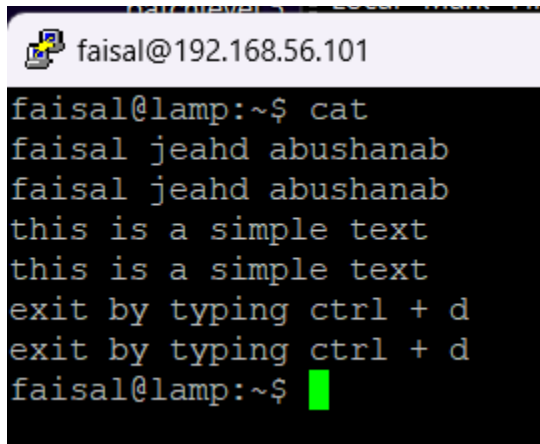
19.Real Vim awaits)



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

More Unix Commands:

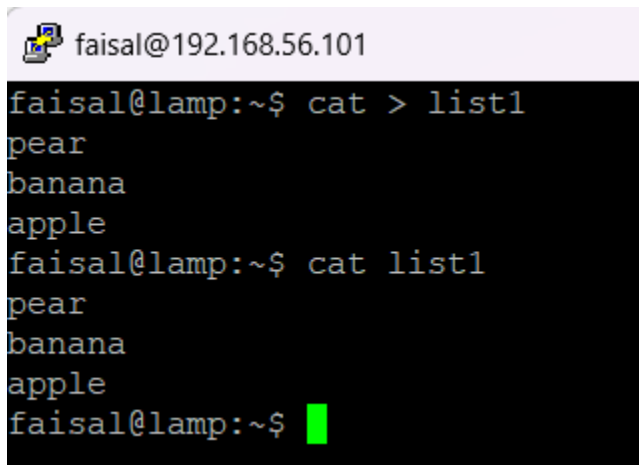
3.1 Redirection



```
faisal@192.168.56.101  
faisal@lamp:~$ cat  
faisal jeahd abushanab  
faisal jeahd abushanab  
this is a simple text  
this is a simple text  
exit by typing ctrl + d  
exit by typing ctrl + d  
faisal@lamp:~$
```

Cat without specifying file

3.2 Redirecting the Output



```
faisal@192.168.56.101  
faisal@lamp:~$ cat > list1  
pear  
banana  
apple  
faisal@lamp:~$ cat list1  
pear  
banana  
apple  
faisal@lamp:~$
```

Redirect the output of cat into list1 file

Exercise 3a

```
faisal@192.168.56.101
faisal@lamp:~$ cat > list2
orange
plum
mango
grapefruit
faisal@lamp:~$ cat list2
orange
plum
mango
grapefruit
faisal@lamp:~$ cat >> list1
peach
grape
orange
faisal@lamp:~$ cat list1
pear
banana
apple
peach
grape
orange
faisal@lamp:~$ cat list1 list2 > biglist

faisal@lamp:~$ cat biglist
pear
banana
apple
peach
grape
orange
orange
plum
mango
grapefruit
faisal@lamp:~$
```

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

```
192.168.8.119 - PuTTY
faisal@lamp:~$ ls list*
list1  list2
faisal@lamp:~$ ls *list
biglist  phonelist
faisal@lamp:~$ ls ?list
ls: cannot access '?list': No such file or directory
faisal@lamp:~$ ls ?ist
ls: cannot access '?ist': No such file or directory
faisal@lamp:~$ ls j?
je
faisal@lamp:~$ ls ?e
je
faisal@lamp:~$ ls ?list1
ls: cannot access '?list1': No such file or directory
faisal@lamp:~$ ls ?ist1
list1
faisal@lamp:~$ █
```

4.3 Getting Help

```

192.168.8.119 - PuTTY
WC(1)                                User Commands                                WC(1)

NAME
    wc - print newline, word, and byte counts for each file

SYNOPSIS
    wc [OPTION]... [FILE]...
    wc [OPTION]... --files0-from=F

DESCRIPTION
    Print newline, word, and byte counts for each FILE, and a total line if
    more than one FILE is specified.  A word is a non-zero-length sequence
    of characters delimited by white space.

    With no FILE, or when FILE is -, read standard input.

    The options below may be used to select which counts are printed, al-
    ways in the following order: newline, word, character, byte, maximum
    line length.

    -c, --bytes
        print the byte counts

Manual page wc(1) line 1 (press h for help or q to quit)

```

```

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

```

```

192.168.8.119 - PuTTY
faisal@lamp:~$ apropos copy
bcopy (3)          - copy byte sequence
copy_file_range (2) - Copy a range of data from one file to another
copysign (3)       - copy sign of a number
copysign (3posix)  - number manipulation function
copysignf (3)      - copy sign of a number
copysignl (3)      - copy sign of a number
cp (1)            - copy files and directories
cp (1posix)       - copy files
cpgr (8)          - copy with locking the given file to the password or gr...
cpio (1)          - copy files to and from archives
cppw (8)          - copy with locking the given file to the password or gr...
dd (1)            - convert and copy a file
dd (1posix)       - convert and copy a file
debconf-copydb (1) - copy a debconf database
exec (1posix)     - execute commands and open, close, or copy file descrip...
getunwind (2)     - copy the unwind data to caller's buffer
getutmp (3)       - copy utmp structure to utmpx, and vice versa
getutmpx (3)      - copy utmp structure to utmpx, and vice versa
git-checkout-index (1) - Copy files from the index to the working tree
head (1posix)     - copy the first part of files
install (1)       - copy files and set attributes
mcopy (1)         - copy MSDOS files to/from Unix
memccpy (3)       - copy memory area

```


5.1 File system security (access rights)

```
192.168.8.119 - PuTTY
faisal@lamp:~$ ls -l
total 60
-rw-r--r-- 1 faisal faisal  65 Jan  1  2023 biglist
-rw-r--r-- 1 faisal faisal 2841 Dec 29 17:47 cod
-rw-r--r-- 1 faisal faisal   0 Jan  1 18:53 je
drwxr-xr-x 3 faisal faisal 4096 Jan  1 19:15 join
drwxr-xr-x 2 faisal faisal 4096 Jan  1 18:49 koko
-rw-r--r-- 1 faisal faisal  37 Jan  1  2023 list1
-rw-r--r-- 1 faisal faisal  28 Jan  1  2023 list2
-rwxrwxr-x 1 faisal faisal 2695 Jan  1 17:37 mmerge
-rw-r--r-- 1 faisal faisal  48 Dec 28 04:17 names
-rw-r--r-- 1 faisal faisal  85 Jan  1  2023 names.txt
-rw-r--r-- 1 faisal faisal 104 Jan  1 18:14 phonelist
-rwxrwxrwx 1 faisal faisal 5255 Jan  1 16:10 srm
-rw-r--r-- 1 faisal faisal 218 Dec 28 05:53 template.txt
drwxr-xr-x 2 root    root    4096 Dec 28 05:29 test
drwxr-xr-x 2 faisal faisal 4096 Jan  1 19:17 trash
faisal@lamp:~$
```

5.2 Changing access rights

```
192.168.8.119 - PuTTY
faisal@lamp:~$ chmod go-rwx biglist
faisal@lamp:~$ chmod a+rw biglist
faisal@lamp:~$ ls -l biglist
-rw-rw-rw- 1 faisal faisal 65 Jan  1  2023 biglist
faisal@lamp:~$
```

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  
^Z
```

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:

```
Linux Software Diagnostics (LSD) Shell Script Ver.1.0
Press Up/Down Keys to move
x User name: faisal (Login name: faisal) x
x Current Shell: /bin/bash x
x Home Directory: /home/faisal x
x Your O/s Type: linux-gnu x
x PATH: /usr/local/bin:/usr/bin:/bin:/usr/local/games:/usr/games x
x Current directory: /home/faisal x
x Currently Logged: 2 user(s) x
x Available Shells: x
x # /etc/shells: valid login shells x
x /bin/sh x
x /bin/bash x
x /usr/bin/bash x
x /bin/rbash x
x /usr/bin/rbash x
x /bin/dash x
x /usr/bin/dash x
x /usr/bin/screen x
tqqqqv(+)qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq6%qqqqqU
x < EXIT > x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq
```

A Shell Script Exercise:

```
root@lamp: /root
faisal@lamp:~$ ./prog.sh hi
* is required
hi*
faisal@lamp:~$ ./prog.sh hi*
Symbol is not required
hi*
faisal@lamp:~$ ./prog.sh *hi
Symbol is not required
*hi
faisal@lamp:~$ ./prog.sh h*i
Symbol is not required
h*i
faisal@lamp:~$ ./prog.sh h**i
Symbol is not required
h**i
faisal@lamp:~$ ./prog.sh hi*ksldf
Symbol is not required
hi*ksldf
faisal@lamp:~$
```

As seen from the tests the program works as required