

Question no.1

Special character

a) How are special characters handled on UNIX? Specifically, what is the interaction of the kernel and the shell when it comes to special characters?

⇒ Special characters are handled differently depending on the context they are used on UNIX. They are used as part of command line arguments, interpreted by the shell whereas, in filenames, some filenames may cause problems.

⇒ The kernel is responsible for managing system resources such as CPU, memory, and input/output device. While the shell provides an interference for users to interact with the operating system. When a user enters a command with special characters, the shell interprets those characters to perform tasks like expanding wildcards, substituting environment variables, or executing pipelines.

```
19706@ip-172-26-2-101:~$ info grep
19706@ip-172-26-2-101:~$ █
```

```
yunishabasnet — ssh 19706@52.43.162.83 -p 1022 — 80x24
Next: Character Classes and Bracket Expressions, Up: Regular Expressions

3.1 Fundamental Structure
=====

The fundamental building blocks are the regular expressions that match a
single character. Most characters, including all letters and digits,
are regular expressions that match themselves. Any meta-character with
special meaning may be quoted by preceding it with a backslash.

    The period '.' matches any single character. It is unspecified
    whether '.' matches an encoding error.

    A regular expression may be followed by one of several repetition
    operators:

    '?'
        The preceding item is optional and will be matched at most once.

    '*'
        The preceding item will be matched zero or more times.

-----Info: (grep)Fundamental Structure, 53 lines --Top-----
```

b) Please name one use of these special characters below

- *

⇒ It is a wildcard character that is commonly used in UNIX commands to match any sequence of the character.

```
19706@ip-172-26-2-101:~$ ls *
a  biglist  example.sh  file1  hello  hw  linux.txt  new  now  save
b  c        example.txt  file2  html   hw5  ls.help    new.txt  rename_k  story

A:
B:
b

B1:
a  b

B2:
a  b1

C:
c

C1:
c1

D:
ABCD
```

- >>

⇒ The double greater than sign (>>) is used to append the output of a command to the end of an existing file.

```
19706@ip-172-26-2-101:~$ cat hw
home hey
home hello
home house
home bag

19706@ip-172-26-2-101:~$ ls >>hw
19706@ip-172-26-2-101:~$ cat hw
home hey
home hello
home house
home bag

A
B
B1
B2
C
C1
D
Dir1
Dir2
Dir3
a
b
biglist
c
chmod_dir
dir2
example.sh
example.txt
file1
file2
filelist.txt
hello
html
hw
hw5
linux.txt
ls.help
new
new.txt
new_directory
now
rename_k
save
story
19706@ip-172-26-2-101:~$
```

- >

⇒ This command is used to redirect the output of a command to a file instead of displaying it on the screen.

```

19706@ip-172-26-2-101:~$ vi example
19706@ip-172-26-2-101:~$ ls
A B1 C D Dir2 a biglist dir2 file1 hello linux.txt new save
B B2 C1 Dir1 Dir3 b c example file2 hw ls.help now story
19706@ip-172-26-2-101:~$ cat example
1
2
3
4
5
19706@ip-172-26-2-101:~$ ls >example
19706@ip-172-26-2-101:~$ cat example
A
B
B1
B2
C
C1
D
Dir1
Dir2
Dir3
a
b
biglist
c
dir2
example
file1
file2
hello
hw
linux.txt
ls.help
new
now
save
story
19706@ip-172-26-2-101:~$ █

```

- []

⇒ This command is used to specify a range of special characters or values for a particular argument.

```

19706@ip-172-26-2-101:~$ ls
A B B1 B2 C C1 D Dir1 Dir2 Dir3 a b biglist c dir2 example file1
file2 file3 file4 file5 file6 file7 file8 file9 hello hw linux.txt
ls.help new now save story
19706@ip-172-26-2-101:~$ ls file[1-9]
file1 file2 file3 file4 file5 file6 file7 file8 file9
19706@ip-172-26-2-101:~$ █

```

- %

⇒ It can be used with different meanings depending on the context.

i) It can be used in modules operator:

```

[19706@ip-172-26-2-101:~$ echo $((7 % 3))
1
19706@ip-172-26-2-101:~$ █

```

ii) It can be used in variable substitution:

```
[19706@ip-172-26-2-101:~$ echo ${PATH%:*}  
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games  
19706@ip-172-26-2-101:~$
```

- &&

⇒ This command is used to run a series of commands where the success of each one depends on the success of the previous one.

```
[19706@ip-172-26-2-101:~$ cd D &&ls  
ABCD  
19706@ip-172-26-2-101:~/D$
```

- |

⇒ It is known as a “pipe” which allows us to redirect the output of one command to another command.

```
19706@ip-172-26-2-101:~$ ls -l |grep a new  
apple  
elephant  
ice-cream  
man  
umbrella  
19706@ip-172-26-2-101:~$
```

- ;

⇒ It is used to execute multiple commands sequentially, regardless of the success or failure of each preceding command.

```

19706@ip-172-26-2-101:~$ echo "Hello"; ls -l
Hello
total 84
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:19 A
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:27 B
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:29 B1
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:30 B2
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:30 C
drwxr-xr-x 2 19706 cs230 4096 Jan 26 19:30 C1
drwxr-xr-x 3 19706 cs230 4096 Jan 26 19:32 D
drwxr-xr-x 2 19706 cs230 4096 Feb 10 10:41 Dir1
drwxr-xr-x 2 19706 cs230 4096 Feb 10 10:41 Dir2
drwxr-xr-x 2 19706 cs230 4096 Feb 10 10:41 Dir3
----- 1 19706 cs230 0 Feb 10 10:09 a
-rw-r--r-- 1 19706 cs230 0 Feb 10 10:09 b
-rw-rw-rw- 1 19706 cs230 62 Feb 14 16:00 biglist
-rw-r--r-- 1 19706 cs230 0 Feb 10 10:09 c
drwxr-xr-x 2 19706 cs230 4096 Feb 10 16:30 dir2
-rw-r--r-- 1 19706 cs230 117 Feb 19 10:40 example
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file1
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file2
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file3
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file4
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file5
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file6
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file7
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file8
-rw-r--r-- 1 19706 cs230 0 Feb 19 10:44 file9
-rw-r--r-- 1 19706 cs230 1053 Feb 10 15:26 hello
-rw-r--r-- 1 19706 cs230 236 Feb 19 10:32 hw
-rw-r--r-- 1 19706 cs230 33 Feb 10 16:11 linux.txt
-rw-r--r-- 1 19706 cs230 8147 Feb 10 10:27 ls.help
-rw-r--r-- 1 19706 cs230 115 Feb 2 13:13 new
-rw-r--r-- 1 19706 cs230 213 Feb 2 13:12 now
-rw-r--r-- 1 19706 cs230 17 Feb 5 00:13 save
-rw-r--r-- 1 19706 cs230 0 Feb 3 15:33 story
19706@ip-172-26-2-101:~$ █

```

- [^]

⇒ It is a negated character set, which matches a single character that is not in the set of characters within the brackets.

```
[19706@ip-172-26-2-101:~$ grep [^a] new
grep: B: Is a directory
grep: C: Is a directory
grep: D: Is a directory
new:cAt
new:goAt
new:kAt
new:ovAl
new:sAt
new:wAtch
19706@ip-172-26-2-101:~$
```

- !\$

⇒ It is a command that refers to the last argument of the previous command. It is a shell shortcut that saves our time.

```
19706@ip-172-26-2-101:~$ ls /usr/local/bin
19706@ip-172-26-2-101:~$ cd !$
cd /usr/local/bin
19706@ip-172-26-2-101:/usr/local/bin$ cd
19706@ip-172-26-2-101:~$
```

Question no.2

Quotes

What is the difference between these quotes? Please use an example to demonstrate

- “ ” (double quotes)

- ⇒ It is used to group together a sequence of characters as a single argument or string. The characters within the double quotes are subject to variable expansion and command substitution.

```
19706@ip-172-26-2-101:~$ echo "Hello, $USER! Today is $(date)"
Hello, 19706! Today is Sun Feb 19 16:08:51 PST 2023
19706@ip-172-26-2-101:~$
```

- ‘ (single quote)

- ⇒ It is used to group together a sequence of characters as a single argument or string. The single quote preserves the original value of all characters within the string, including any special characters or spaces.

```
19706@ip-172-26-2-101:~$ echo 'Hello, $USER! Today is $(date)'
Hello, $USER! Today is $(date)
19706@ip-172-26-2-101:~$
```

- ` (back single quote)

- ⇒ It is used to execute a command and substitute the output of the command into a string. The output of the command will replace the backticks in the string.

```
19706@ip-172-26-2-101:~$ echo "The current working directory is: `pwd`"
The current working directory is: /home/19706
19706@ip-172-26-2-101:~$
19706@ip-172-26-2-101:~$
```

Question no.3

Vi and emacs

- What are the 2 modes in vi?

⇒ There are two modes they are:

- i) Command mode: In this mode, we can use keyword commands to navigate the file, edit text, and perform other operations. Some examples are:
 - a) 'h', 'k', 'j', and 'l': it helps to move the cursor left, up, down, and right respectively.
 - b) 'i': to insert mode at the current cursor position.

```
1 Command mode: In this mode, we can use keyword commands to navigate the file, edit text, and perform other operations. Some examples are:  
2 "h", "k", "j", and "l": it helps to move the cursor left, up, down, and right respectively.  
3 "i": to insert mode at the current cursor position.  
4 "p": to copy the line to the clipboard.  
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c) 'yy': to copy the line to the clipboard.

1

after pressing double y we will be able to copy the line. While you press one y it will note the command as shown in the above diagram.

- ii) Insert mode: When we want to insert the text in the file we need to switch it to insert mode. For that, we need to press 'i' key in the command mode. To save the text we need to go back into the command mode and save it.

- Open the file in vi:

```
19706@ip-172-26-2-101:~$ vi myfile.txt
19706@ip-172-26-2-101:~$
```

- Switch to insert mode and start typing:

```
i this is the demonstrtation.
~
~
~
-- INSERT -- 1,30
```

- Save the changes and exit vi:

```
i this is the demonstrtation.
~
~
~
:wq!
```

- What are the 2 modes in emacs?

⇒ There are two modes they are:

- i) Command mode: In this mode, we can use keyboard shortcuts to perform various operations, such as

opening and closing files, moving the cursor, deleting text, and saving files. Some common commands in the command mode include:

- a) C-x C-f: Open a file for editing.
- b) C-x C-s: Save the current file.
- c) C-x C-c: Quit Emacs.
- d) C-a: Move the cursor to the beginning of the line.

- ii) Insert mode: to insert text into the file as you would in any other text editor. To switch to insert mode, use the “C-x i” or “i” shortcut.

```
19706@ip-172-26-2-101:~$ emacs myfile.txt

Command 'emacs' not found, but can be installed with:

snap install emacs      # version 28.2, or
apt install e3           # version 1:2.71-2
apt install emacs-gtk    # version 1:26.3+1-1ubuntu2
apt install emacs-lucid  # version 1:26.3+1-1ubuntu2
apt install emacs-nox    # version 1:26.3+1-1ubuntu2
apt install jove         # version 4.17.2.7-1

See 'snap info emacs' for additional versions.

19706@ip-172-26-2-101:~$ █
```

- How do you yank one line from line 5 and paste it to line 2 on vi?
 - ⇒ To copy one line from line 5 we can move the cursor to 5 lines and double press the key “yy” and then again move the cursor to line 2 and press “p” to paste it.

```
yunishabasnet — ssh 19706@52.43.162.83 -p 1022 — 102x9
1) hello, how are you?
2) i am fine.
3) what are you doing.
4) i am doing my mini project.
5) ohh wow!
6) have you completed your?
7) no not yet.
~
5,1 All
```

```
yunishabasnet — ssh 19706@52.43.162.83 -p 1022 — 102x9
1) hello, how are you?
2) i am fine.
3) what are you doing.
4) i am doing my mini project.
5) ohh wow!
6) have you completed your?
7) no not yet.
~
3,1 All
```

⇒ To yank the 5 lines together we can use the command “y5y” and put the cursor back to line 2 and paste it.

```
yunishabasnet — ssh 19706@52.43.162.83 -p 1022 — 102x9
hello, how are you?
i am fine.
what are you doing.
i am doing my mini project.
ohh wow!
have you completed your?
no not yet.
5 lines yanked
5 1,1 All
```

```
yunishabasnet — ssh 19706@52.43.162.83 -p 1022 — 108x12
1) hello, how are you?
2) i am fine.
5) ohh wow!
6) have you completed your?
7) no not yet.
3) what are you doing.
4) i am doing my mini project.
5) ohh wow!
6) have you completed your?
7) no not yet.
~
10,1 All
```

- How do you save the results and exit on emacs?

⇒ To save the results and exit on emacs is “C-x C-s” or “C-x C-c”

```
19706@ip-172-26-2-101:~$ emacs myfile.txt

Command 'emacs' not found, but can be installed with:

snap install emacs      # version 28.2, or
apt install e3          # version 1:2.71-2
apt install emacs-gtk   # version 1:26.3+1-1ubuntu2
apt install emacs-lucid # version 1:26.3+1-1ubuntu2
apt install emacs-nox   # version 1:26.3+1-1ubuntu2
apt install jove        # version 4.17.2.7-1

See 'snap info emacs' for additional versions.

19706@ip-172-26-2-101:~$ █
```

Question no.4

File manipulation

- How do you sort on the second field of a file named "report" numerically and save the results to another file named "report.sort"?
 - ⇒ To sort on the second field of a file named "report" numerically and save the results to another file named "report.sort", you can use the sort command with the -k option to specify the field to sort on and the -n option to perform a numerical sort.

```

19706@ip-172-26-2-101:~$ cat report
1
4
3
2
5
9
7
8
2
5
7
8
5

19706@ip-172-26-2-101:~$ sort -k 2n report > report.sort
19706@ip-172-26-2-101:~$ cat report.sort

1
2
2
3
4
5
5
5
5
7
7
8
8
9
19706@ip-172-26-2-101:~$ █

```

- How do you count the number of lines with the word "going" in this file named "bank_report"?
 ⇒ To count the number of lines that contain the word "going" in a file named "bank_report", we can use the grep command to search for the word "going" and the wc command to count the number of lines.

```

[19706@ip-172-26-2-101:~$ vi bank_report
[19706@ip-172-26-2-101:~$ cat bank_report
hello.
i am going house today.
i am leaving.
i am going out today.
i am leaving today.
19706@ip-172-26-2-101:~$ grep -c 'going' bank_report
2
19706@ip-172-26-2-101:~$ █

```

- How do you take the first 3 columns from first 100 lines of one file named "col1", first 4 columns from first 100 lines of another file named "col2" and put them together into one file named "col_combined"? The result is a file with 100 lines and 7 fields.

⇒ To take the first 3 columns from the first 100 lines of a file named "col1", the first 4 columns from the first 100 lines of another file named "col2", and put them together into one file named "col_combined" with 100 lines and 7 fields, we can use the cut command to extract the columns and the paste command to combine them.

```
19706@ip-172-26-2-101:~$ vi col1
19706@ip-172-26-2-101:~$ vi col2
19706@ip-172-26-2-101:~$ cut -f 1-3 col1 | head -n 100 > col1_cut
19706@ip-172-26-2-101:~$ cut -f 1-4 col2 | head -n 100 > col2_cut
19706@ip-172-26-2-101:~$ paste col1_cut col2_cut > col_combined
```

○ Cat col1 :

```
19706@ip-172-26-2-101:~$ cat col1
Linux is an open-source, free operating system based on the Unix architecture. It was developed by Linus Torvalds in the early 1990s and is now widely used for servers, desktop computers, and embedded devices such as smartphones and tablets. Linux is known for its stability, security, and flexibility, and is used in a wide range of applications, from web servers and databases to scientific computing and gaming. Linux is also highly customizable, and users can choose from a variety of distributions, or "distros", each with its own unique features and applications.

Hello is a common greeting used to acknowledge and initiate communication with others. It is a simple word that carries a friendly and welcoming tone and is used in many cultures around the world. The word hello has its roots in the English language and has been used as a greeting for centuries. It is a versatile word that can be used in a variety of situations, both formal and informal, and is a good way to start a conversation with someone new or say hello to an old friend.

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○ Cat col2:

- Cat col_combined: