



SOFE 3200U: Systems Programming

Tutorial 2

Fall 2020

Abdelrahman Elewah

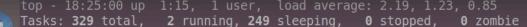


In the previous tutorial, we have this unanswered question that related to top command





File Edit View Search Terminal Help



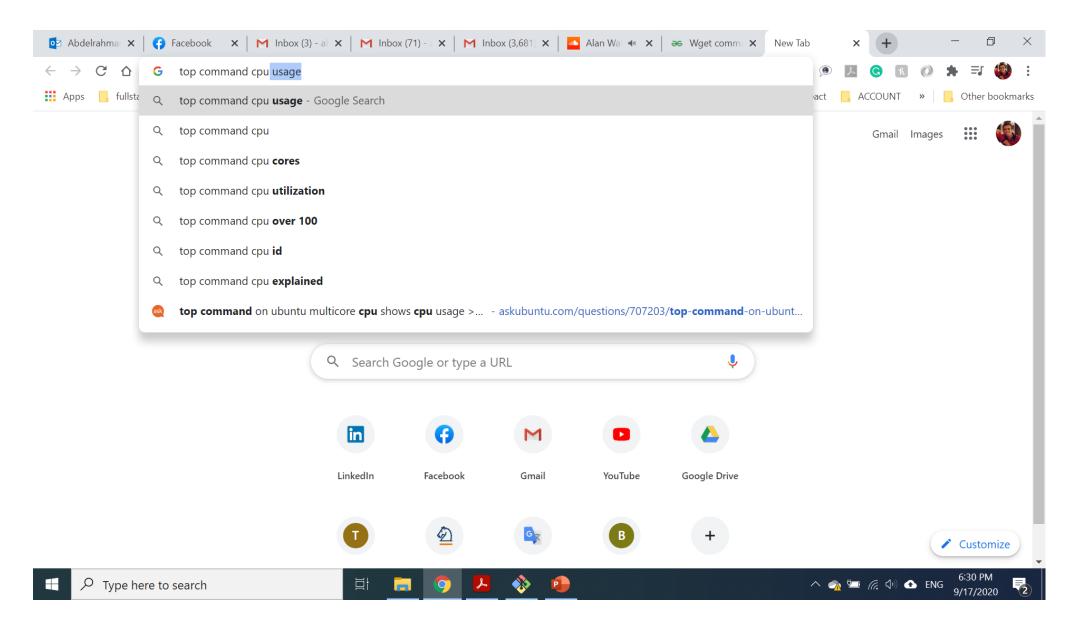
%Cpu(s): 27.0 us, 6.3 sy, 0.0 ni, 62.9 id, 2.8 wa, 0.0 hi, 1.0 si, 0.0 st

KiB Mem : **8046832** total, **1075628** free, **3296752** used, **3674452** buff/cache KiB Swap: **15625212** total, **15625212** free, **0** used. **3572332** avail Mem

г		
١.		
н		
ш	_	

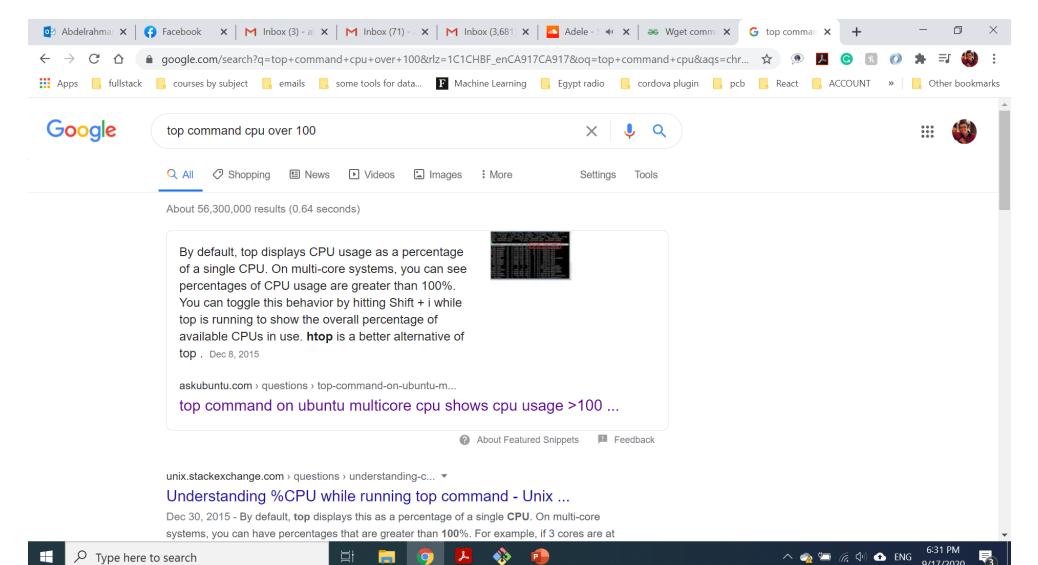
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
18017	elewah	20	0	23.088g	505000	154596	S	151.5	6.3	0:34.00	chrome
14334	elewah			729788						3:19.21	chrome
14295	elewah	20	0	1219280	285532	145688	S	21.9	3.5	3:37.29	chrome
3253	elewah	9	-11	2383184	19432	15352	S	15.6	0.2	0:03.46	pulseaudio
3221	elewah	20	0	4045000	249996	115496	S	11.3	3.1	3:01.34	gnome-shell
1530	elewah	20	0	2335416	119924	83992		10.0	1.5	2:42.33	Xorg
				599372		65188				0:39.19	

Top command

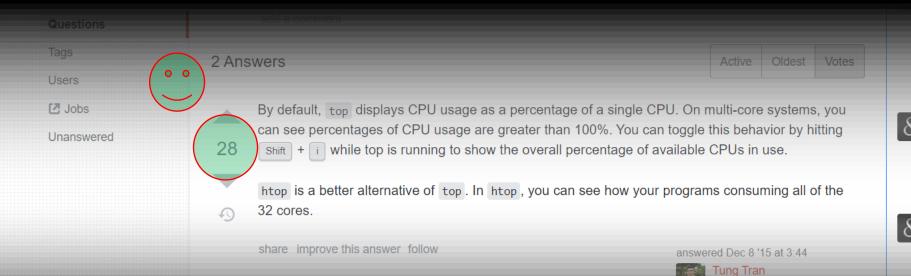




Top command







User Research International

No office location

REMOTE

Iot linux

Merchant Services - L1 Production Support

JPMorgan Chase Bank, N.A.

Toronto, ON, Canada

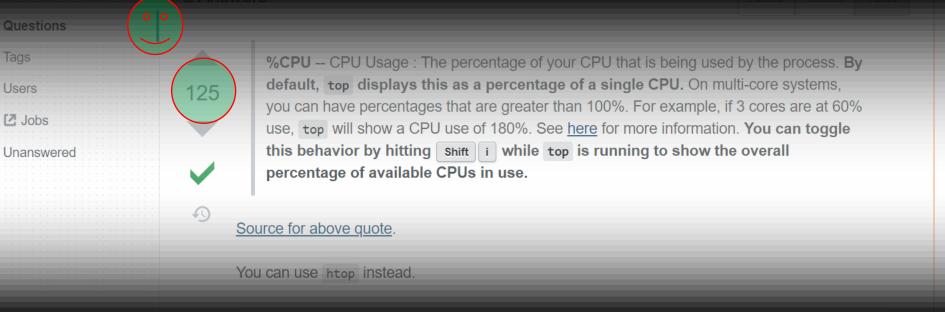
web-services design

Production Support, Banking, Associate

JPMorgan Chase Bank, N.A.

Toronto, ON, Canada

3,267 • 1 • 13 • 26



web-services python



Cybersecurity Attack Analyst

JPMorgan Chase Bank, N.A.

Toronto, ON, Canada

sysadmin security



F&O Trading Production Management, Application Support Engineer

JPMorgan Chase Bank, N.A.

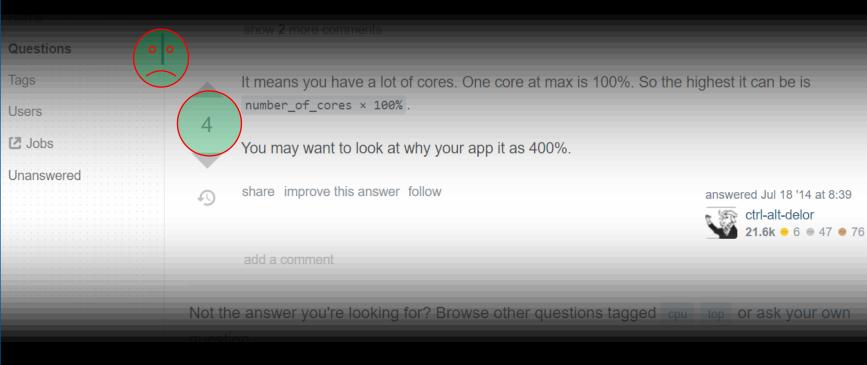
♥ Toronto, ON, Canada

linux sysadmin

QA engineer/tester for Esports

FirstBlood ♥ No office location

\$35K - \$60K @ REMOT



What is the cause of this strange security behavior?

Why does this IF statement work on the command line but not in a script?

Owen's Defence playability

What are the hidden fees for using booking.com

What is the difference between IAN and LNAV/VNAV?

Would this homebrew version of True Strike be balanced?

Are there shortcut for text editors/processors to delete the rest of a line?

Agenda

- 1. Downloading This Tutorial Using wget Command
- 2. Shell Plumbing
- 3. Pipes
- 4. Redirects
- 5. Basic Commands
- 6. Quiz



Downloading This Tutorial Using wget Command



Downloading This Tutorial using wget Command

- 1. wget command: wget http://ericdube.com/sofe3200/2/INDEX.md
- 2. Github is software development and version control
- 3. Markdown language

Good online course to learn Git and GitHub:

-https://www.udacity.com/course/version-control-with-git--ud123

-https://www.udacity.com/course/version-control-with-git--ud456

wget https://github.com/elewah/elewah.github.io/blob/master/courses/system%20programming/Tutorial2.pdf





Shell Plumbing



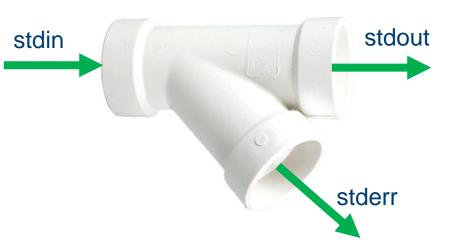
Shell Plumbing

A shell is a CLI (Command-Line Interface)

Streams

When you run any program in the shell, it will have access to three streams: -

- 1. One input stream:stdin (standard in)
- 2. Two output streams: stdout and stderr (standard out and standard error)



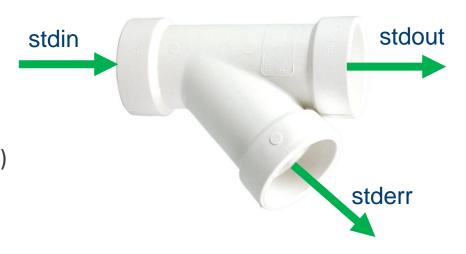


Shell Plumbing

Why two output streams?

- ☐ It is important to distinguish between valid output of a command and output due to errors. Like a function, you can make some assumptions about the output of a command. If errors were mixed in with the output, you wouldn't be able to make these assumptions.
- For example, the ls command will always write a list of files (or nothing) to stdout. Any error message is sent over stderr.
- ☐ For instance try this command

ls /root /var (stdout)







Pipes



Pipes

- Pipes are a very powerful tool which allow you to create your own data flow in the terminal. A pipe connects two streams together.
- The piped commands run concurrently. This can be very helpful for basic multiprocessing.
- For example, running the following will display all files in the working directory which contain the letter "a".

```
ls | grep "a"
```





Redirects



Redirects

- The output of a command can also be directed to a file (or stream) using redirection.
- Using < will redirect a file's contents to stdin
- while using > will redirect stdout and write it to a file.

```
echo "Hello, world!" > helloworld.txt
printf "This is cool! \n This is awesome!" > myfile.txt
grep "a" < myfile.txt</pre>
```







man

man will display usage instructions for a command. For example man man displays the usage of man.

pwd and Is

pwd stands for Print Working Directory. It displays the current working directory. This command normally doesn't take any parameters.

Is [OPTION]... {FILE]... lists the contents of the working directory, or a directory passed as an argument. This command also has flags to change the behaviour, which you can see by running 1s --help Or man 1s.

date

date is a command which can print the date and time. A format can be passed preceded by a plus symbol. For example, date +%I:%M:%S\ %p displays the time in this format: 9:00:00 PM



cat

cat is a command intended for concatenating files, but there are many useful applications of cat. This command can take input from multiple files and the input stream, and will write all of these to the output stream.

examples:

```
reat file1.txt file2.txt - Display the contents of two files
reat file1.txt file2.txt > file1and2.txt - Concatenate files
recho "hello" | cat file1.txt - - Append "hello" to a file
```

more

more is a useful command to display an input one screen at a time. For example: ls -R / l more displays all files, one screen at a time.



head and tail

head and tail display the first lines and last lines of a file respectively. By default, they display the last 10 lines, but passing the -n flag (ex: head -n 5) can override this behaviour. tail also has a flag -f to follow the end of a file. In this mode, tail will stay open and display every new line added to a file

mkdir, rmdir, cd

mkdir and rmdir provide creation and deletion of directories respectively. Note that rmdir requires the directory to be empty for removal.

cd [PATH] changes the current directory. With no parameters, cd will set the working directory to the user's home directory.

mv, cp

my is the rename command. It takes two arguments: source and destination.



WC

wc is a useful command for counting words, lines, or characters. It can receive input from stdin, or a filename as an argument. There are three flags available: 1, w, and c; for lines, words, and characters respectively. For example, to display the number of lines and words in some input text, try printf "Hello\nThis is text" | wc.

Note: Even if the flags are passed in a different order, wc will always display lines, words, then characters.

sort

sort will sort input from stdin, or from a filename accepted as a paramters.



chown, chgrp, chmod

chown [USER] FILE changes the owner of a specified file. With only the file as a parameter, chown by default changes the user to the current user.

chgrp GROUP FILE changes the group of the specified file.

chmod MODE FILE changes the permissions of the specified file to the specified mode.

examples:

Ichown FILE.txt - Change ownership of FILE.txt to current user

Ichgrp www-data /var/www/html - Change group of /var/www/html to the www-data group

Ichmod 640 file.doc - Change permissions of file.doc so owner has read and write access, group

has read access, and other users have no access.



Permissions

drwxrwxrwx

Permissions are represented as a bitmask containing 9 bit values. - The first three bits represent the owner's permissions. - The second three bits represent the group's permissions. - The last three bits represent the permissions of other users.

Each three bits are usually represented as rwx. For example, r-x represents read and execute permissions, without write permissions.

When you pass the -a flag to ls you will see the a line representing the file permissions. It will also contain a d character at the beginning of the item is a directory (or a dash otherwise).





Quiz

