

# Lab 8

## Practice Exercises

### Practice 1

```
student@fedora:~$ cat /etc/passwd
root:x:0:0:Super User:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin
adm:x:3:4:adm:/var/adm:/usr/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/usr/sbin/nologin
operator:x:11:0:operator:/root:/usr/sbin/nologin
games:x:12:100:games:/usr/games:/usr/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/usr/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User://:/usr/sbin/nologin

student@fedora:~$ tac /etc/passwd
user:x:1000:1000:user:/home/koishi:/usr/bin/zsh
student:x:1001:1001::/home/student:/usr/bin/zsh
qemu:x:107:107:qemu user://:/usr/sbin/nologin
gluster:x:965:965:GlusterFS daemons:/run/gluster:/usr/sbin/nologin
lightdm:x:967:967:LightDM daemon:/var/lib/lightdm:/sbin/nologin
sstpc:x:971:968:Secure Socket Tunneling Protocol(SSTP) Client:/var/run/sstpc:/sbin/nologin
nm-fortisslvpn:x:972:969:Default user for running openfortivpn spawned by NetworkManager://:/sbin/nologin
wsdd:x:973:970:Web Services Dynamic Discovery host daemon://:/sbin/nologin
firebird:x:974:971://:/sbin/nologin
stapunpriv:x:159:159:systemtap unprivileged user:/var/lib/stapunpriv:/sbin/nologin
akmods:x:975:974:User is used by akmods to build akmod packages:/var/cache/akmods:/sbin/nologin
dnsmasq:x:976:976:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/bin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/usr/bin/nologin
passim:x:978:978:Local Caching Server:/usr/share/empty:/usr/bin/nologin

student@fedora:~$ cat -nE /etc/passwd
1 root:x:0:0:Super User:/root:/bin/bash$
2 bin:x:1:1:bin:/bin:/usr/sbin/nologin$
3 daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin$
4 adm:x:3:4:adm:/var/adm:/usr/sbin/nologin$
5 lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin$
6 sync:x:5:0:sync:/sbin:/bin/sync$
7 shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown$
8 halt:x:7:0:halt:/sbin:/sbin/halt$
9 mail:x:8:12:mail:/var/spool/mail:/usr/sbin/nologin$
10 operator:x:11:0:operator:/root:/usr/sbin/nologin$
11 games:x:12:100:games:/usr/games:/usr/sbin/nologin$
12 ftp:x:14:50:FTP User:/var/ftp:/usr/sbin/nologin$
13 nobody:x:65534:65534:Kernel Overflow User://:/usr/sbin/nologin$
14 tss:x:59:59:Account used for TPM access://:/usr/bin/nologin$
15 dbus:x:81:81:System Message Bus://:/usr/bin/nologin$
16 systemd-oom:x:999:999:systemd Userspace OOM Killer://:/usr/bin/nologin$
17 polkitd:x:114:114:User for polkitd://:/sbin/nologin$
```

```
student@student@fedora:~
```

```
> head -5 /etc/passwd
root:x:0:0:Super User:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin
adm:x:3:4:adm:/var/adm:/usr/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin
> tail -5 /etc/passwd
lightdm:x:967:967:LightDM daemon:/var/lib/lightdm:/sbin/nologin
gluster:x:965:965:GlusterFS daemons:/run/gluster:/usr/sbin/nologin
qemu:x:107:107:qemu user:/usr/sbin/nologin
student:x:1001:1001::/home/student:/usr/bin/zsh
user:x:1000:1000:user:/home/koishi:/usr/bin/zsh
> tail -1 /etc/passwd
user:x:1000:1000:user:/home/koishi:/usr/bin/zsh
> head -1 /etc/passwd
root:x:0:0:Super User:/root:/bin/bash

^ 15:59:47
>
```

```
15824
15825 Professor Michael S. Hart was the originator of the Project
15826 Gutenberg™ concept of a library of electronic works that could be
15827 freely shared with anyone. For forty years, he produced and
15828 distributed Project Gutenberg™ eBooks with only a loose network of
15829 volunteer support.
15830
15831 Project Gutenberg™ eBooks are often created from several printed
15832 editions, all of which are confirmed as not protected by copyright in
15833 the U.S. unless a copyright notice is included. Thus, we do not
15834 necessarily keep eBooks in compliance with any particular paper
15835 edition.
15836
15837 Most people start at our website which has the main PG search
15838 facility: www.gutenberg.org.
15839
15840 This website includes information about Project Gutenberg™,
15841 including how to make donations to the Project Gutenberg Literary
15842 Archive Foundation, how to help produce our new eBooks, and how to
15843 subscribe to our email newsletter to hear about new eBooks.
15844
15845
```

```
^ 15:54:50
> cat -n ~/Documents/sample_files/Txt/dracula.txt
```

## Practice 2

```
student@fedora:~$ cut -d":" -f1 /etc/passwd
root
bin
daemon
adm
lp
sync
shutdown
halt
mail
operator
games
ftp
nobody
tss
dbus
systemd-oom
polkitd
systemd-coredump
systemd-timesync
chrony
systemd-network
systemd-resolve
avahi
unbound
geoclue
mysql
openvpn
nm-openvpn
abrt
nm-openconnect
rtkit
```

```
student@fedora:~/Documents/sample_files/Csv
```

```
> cut -d";" -f1,4 --output-delimiter=" calories = " cereal.csv
name calories = calories
String calories = Int
100% Bran calories = 70
100% Natural Bran calories = 120
All-Bran calories = 70
All-Bran with Extra Fiber calories = 50
Almond Delight calories = 110
Apple Cinnamon Cheerios calories = 110
Apple Jacks calories = 110
Basic 4 calories = 130
Bran Chex calories = 90
Bran Flakes calories = 90
Cap'n'Crunch calories = 120
Cheerios calories = 110
Cinnamon Toast Crunch calories = 120
Clusters calories = 110
Cocoa Puffs calories = 110
Corn Chex calories = 110
Corn Flakes calories = 100
Corn Pops calories = 110
Count Chocula calories = 110
Cracklin' Oat Bran calories = 110
Cream of Wheat (Quick) calories = 100
Crispix calories = 110
Crispy Wheat & Raisins calories = 100
Double Chex calories = 100
Froot Loops calories = 110
Frosted Flakes calories = 110
Frosted Mini-Wheats calories = 100
Fruit & Fibre Bites, Honey & Date calories = 100
```

```
student@student@fedora:~
```

```
> cut -d":" -f1,6 --output-delimiter=">" /etc/passwd
root>/root
bin>/bin
daemon>/sbin
adm>/var/adm
lp>/var/spool/lpd
sync>/sbin
shutdown>/sbin
halt>/sbin
mail>/var/spool/mail
operator>/root
games>/usr/games
ftp>/var/ftp
nobody>/
tss>/
dbus>/
systemd-oom>/
polkitd>/
systemd-coredump>/
```

```
student@student@fedora:~/Documents/sample_files/Csv
```

```
> cut -d";" -f1 cereal.csv
name
String
100% Bran
100% Natural Bran
All-Bran
All-Bran with Extra Fiber
Almond Delight
Apple Cinnamon Cheerios
Apple Jacks
Basic 4
Bran Chex
Bran Flakes
Cap'n'Crunch
Cheerios
Cinnamon Toast Crunch
Clusters
Cocoa Puffs
Corn Chex
Corn Flakes
Corn Pops
Count Chocula
Cracklin' Oat Bran
Cream of Wheat (Quick)
```

```
student@fedora:~/Documents/sample_files/Csv
> cut -d";" -f1,4 --output-delimiter=" calories = " cereal.csv
name calories = calories
String calories = Int
100% Bran calories = 70
100% Natural Bran calories = 120
All-Bran calories = 70
All-Bran with Extra Fiber calories = 50
Almond Delight calories = 110
Apple Cinnamon Cheerios calories = 110
Apple Jacks calories = 110
Basic 4 calories = 130
Bran Chex calories = 90
Bran Flakes calories = 90
Cap'n'Crunch calories = 120
Cheerios calories = 110
Cinnamon Toast Crunch calories = 120
Clusters calories = 110
Cocoa Puffs calories = 110
Corn Chex calories = 110
Corn Flakes calories = 100
Corn Pops calories = 110
Count Chocula calories = 110
Cracklin' Oat Bran calories = 110
Cream of Wheat (Quick) calories = 100
Crispix calories = 110
Crispy Wheat & Raisins calories = 100
Double Chex calories = 100
Froot Loops calories = 110
Frosted Flakes calories = 110
Frosted Mini-Wheats calories = 100
```

### Practice 3

```
student@fedora:~/Documents/sample_files/Csv
> sort cars.csv
AMC Ambassador Brougham;13.0;8;360.0;175.0;3821.;11.0;73;US
AMC Ambassador DPL;15.0;8;390.0;190.0;3850.;8.5;70;US
AMC Ambassador SST;17.0;8;304.0;150.0;3672.;11.5;72;US
AMC Concord;19.4;6;232.0;90.00;3210.;17.2;78;US
AMC Concord;24.3;4;151.0;90.00;3003.;20.1;80;US
AMC Concord d/l;18.1;6;258.0;120.0;3410.;15.1;78;US
AMC Concord DL;23.0;4;151.0;0;3035.;20.5;82;US
AMC Concord L;20.2;6;232.0;90.00;3265.;18.2;79;US
AMC Gremlin;18.0;6;232.0;100.0;2789.;15.0;73;US
AMC Gremlin;19.0;6;232.0;100.0;2634.;13.0;71;US
AMC Gremlin;20.0;6;232.0;100.0;2914.;16.0;75;US
AMC Gremlin;21.0;6;199.0;90.00;2648.;15.0;70;US
AMC Hornet;18.0;6;199.0;97.00;2774.;15.5;70;US
AMC Hornet;18.0;6;232.0;100.0;2945.;16.0;73;US
AMC Hornet;19.0;6;232.0;100.0;2901.;16.0;74;US
AMC Hornet;22.5;6;232.0;90.00;3085.;17.6;76;US
AMC Hornet Sportabout (sw);18.0;6;258.0;110.0;2962.;13.5;71;US
AMC Matador;14.0;8;304.0;150.0;3672.;11.5;73;US
AMC Matador;15.0;6;258.0;110.0;3730.;19.0;75;US
AMC Matador;15.5;8;304.0;120.0;3962.;13.9;76;US
AMC Matador;16.0;6;258.0;110.0;3632.;18.0;74;US
AMC Matador;18.0;6;232.0;100.0;3288.;15.5;71;US
AMC Matador (sw);14.0;8;304.0;150.0;4257.;15.5;74;US
AMC Matador (sw);15.0;8;304.0;150.0;3892.;12.5;72;US
AMC Pacer;19.0;6;232.0;90.00;3211.;17.0;75;US
AMC Pacer d/l;17.5;6;258.0;95.00;3193.;17.8;76;US
AMC Rebel SST;16.0;8;304.0;150.0;3433.;12.0;70;US
AMC Rebel SST (sw);0;8;360.0;175.0;3850.;11.0;70;US
AMC Spirit DL;27.4;4;121.0;80.00;2670.;15.0;79;US
Audi 100LS;20.0;4;114.0;91.00;2582.;14.0;73;Europe
Audi 100LS;23.0;4;115.0;95.00;2694.;15.0;75;Europe
Audi 100 LS;24.0;4;107.0;90.00;2430.;14.5;70;Europe
```

```
student@fedora:~/Documents/sample_files/Csv
> sort -o sorted_cars.csv cars.csv
> wc -l sorted_cars.csv
408 sorted_cars.csv
> wc -m sorted_cars.csv
22663 sorted_cars.csv
```

## Challenge

## Amount of logs in file

```
> wc -l access.log  
100 access.log
```

## First user to interact with application

```
> head -1 access.log  
2025-08-19 22:52:50 Touka /admin DENIED
```

## Last user to interact with application

```
> tail -1 access.log  
2025-10-15 18:47:18 Asimov /admin FAIL
```

## First 15 events in file

```
> head -15 -v access.log  
==> access.log <==  
2025-08-19 22:52:50 Touka /admin DENIED  
2025-11-01 08:58:29 Haruka /logout FAIL  
2025-09-16 20:54:09 Julia /404 DENIED  
2025-11-24 04:19:22 Annie /upload DENIED  
2025-10-18 18:57:08 Haruka /reset SUCCESS  
2025-03-20 20:07:05 Eren /settings SUCCESS  
2025-11-08 01:38:18 Julia /download FAIL  
2025-08-03 20:18:54 Touka /download FAIL  
2025-01-07 23:37:16 Touka /login DENIED  
2025-09-08 19:04:03 Honami /upload SUCCESS  
2025-05-28 06:46:39 Seras /download DENIED  
2025-12-09 03:34:05 Touka /dashboard DENIED  
2025-05-15 03:20:18 Honami /admin FAIL  
2025-05-14 20:40:34 Eren /logout SUCCESS  
2025-06-12 18:28:41 Spike /download FAIL
```

## Last 15 events in file

```
> tail -v -n15 access.log
==> access.log <==
2025-02-22 16:52:09 Jet /404 SUCCESS
2025-10-15 00:44:13 Edward /upload FAIL
2025-11-10 23:52:31 Rize /404 SUCCESS
2025-09-19 10:37:14 Ein /settings DENIED
2025-05-28 19:41:03 Eren /admin SUCCESS
2025-08-14 10:21:44 Asimov /settings SUCCESS
2025-01-15 01:40:23 Rei /admin SUCCESS
2025-03-28 05:34:17 Ken /settings FAIL
2025-02-22 01:12:20 Shinji /login DENIED
2025-01-20 03:42:01 Touka /404 DENIED
2025-08-22 06:30:13 Jet /admin FAIL
2025-09-04 02:13:08 Edward /dashboard SUCCESS
2025-10-12 21:53:26 Arisu /reset FAIL
2025-11-18 14:23:49 Ken /admin FAIL
2025-10-15 18:47:18 Asimov /admin FAIL
```

## All users that logged an event

```
> cut -d' ' -f3 access.log
Touka
Haruka
Julia
Annie
Haruka
Eren
Julia
Touka
Touka
Honami
Seras
Touka
Honami
Eren
Spike
Asimov
Jet
Haruka
Spike
Eren
Jet
Annie
Seras
Touka
Annie
Rei
```

## Alphabetically ordered username log, saved file

```
> sort -t" " -k3 -o sorted_access_log_by_uname.log access.log
> ls -l sorted_access_log_by_uname.log
-rw-r--r--. 1 student student 4044 Dec 13 15:32 sorted_access_log_by_uname.log
```

## Alphabetically ordered endpoint log, saved file

```
> sort -t" " -k4 -o sorted_access_log_by_endpoint.log access.log
```

## LogFile Checks

```
> head -4 sorted_access_log_by_*.log
==> sorted_access_log_by_endpoint.log <==
2025-01-20 03:42:01 Touka /404 DENIED
2025-03-22 01:12:07 Kei /404 DENIED
2025-07-08 10:13:20 Spike /404 DENIED
2025-09-16 20:54:09 Julia /404 DENIED

==> sorted_access_log_by_uname.log <==
2025-04-21 14:46:35 Annie /admin FAIL
2025-01-06 20:07:06 Annie /login DENIED
2025-10-06 21:19:34 Annie /reset SUCCESS
2025-11-24 04:19:22 Annie /upload DENIED
```

## Access delimiter command

```
student@fedora:~/Documents/accesslog
```

```
> cut -d" " -f3,4 --output-delimiter=" accessed: " access.log
Touka accessed: /admin
Haruka accessed: /logout
Julia accessed: /404
Annie accessed: /upload
Haruka accessed: /reset
Eren accessed: /settings
Julia accessed: /download
Touka accessed: /download
Touka accessed: /login
Honami accessed: /upload
Seras accessed: /download
Touka accessed: /dashboard
Honami accessed: /admin
Eren accessed: /logout
Spike accessed: /download
Asimov accessed: /reset
Jet accessed: /logout
Haruka accessed: /admin
Spike accessed: /dashboard
Eren accessed: /404
Jet accessed: /download
Annie accessed: /admin
Seras accessed: /logout
Touka accessed: /logout
Annie accessed: /login
Rei accessed: /reset
Touka accessed: /logout
Arisu accessed: /settings
Rei accessed: /settings
Rei accessed: /404
Jet accessed: /login
```