

```

• MobaXterm Personal Edition v23.4 •
(SSH client, X server and network tools)

➤ SSH session to vm1@192.168.1.185
• Direct SSH      : ✓
• SSH compression : ✓
• SSH-browser     : ✓
• X11-forwarding  : ✓ (remote display is forwarded through SSH)

➤ For more info, ctrl+click on help or visit our website.

```

Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

```

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro

```

System information as of Fri Oct 17 09:45:18 PM UTC 2025

```

System load: 0.17          Processes: 230
Usage of /: 53.0% of 9.75GB Users logged in: 1
Memory usage: 17%          IPv4 address for ens33: 192.168.1.185
Swap usage: 0%

```

Expanded Security Maintenance for Applications is not enabled.

```

72 updates can be applied immediately.
42 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

```

```

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

```

```

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet
connection or proxy settings

```

```

Last login: Fri Oct 17 21:21:52 2025 from 192.168.1.173
vm1@vm1:~$ 
vm1@vm1:~$ 
vm1@vm1:~$ ll
total 44
drwxr-x--- 4 vm1  vm1  4096 Oct 17 21:45 .
drwxr-xr-x  3 root  root  4096 Oct 17 02:44 ..
-rw-----  1 vm1  vm1  1798 Oct 17 14:53 .bash_history
-rw-r--r--  1 vm1  vm1   220 Mar 31  2024 .bash_logout
-rw-r--r--  1 vm1  vm1  3771 Mar 31  2024 .bashrc
drwx----- 2 vm1  vm1  4096 Oct 17 02:45 .cache/
-rw-----  1 vm1  vm1    20 Oct 17 21:18 .lesshist
-rw-r--r--  1 vm1  vm1   807 Mar 31  2024 .profile
drwx----- 2 vm1  vm1  4096 Oct 17 02:45 .ssh/

```

```
-rw-r--r-- 1 vm1 vm1 0 Oct 17 02:46 .sudo_as_admin_successful
-rw----- 1 vm1 vm1 2763 Oct 17 21:26 .viminfo
-rw----- 1 vm1 vm1 98 Oct 17 21:45 .Xauthority
vm1@vm1:~$ cd /tmp/
vm1@vm1:/tmp$ mkdir Assignments
vm1@vm1:/tmp$ cat > employees.csv
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
Amr,32,Analyst,Cairo,43000^C
vm1@vm1:/tmp$ cat employees.csv
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ ll
total 68
drwxrwxrwt 16 root root 4096 Oct 17 21:47 ./
drwxr-xr-x 23 root root 4096 Oct 17 02:25 ../
drwxrwxr-x 2 vm1 vm1 4096 Oct 17 21:47 Assignments/
-rw-rw-r-- 1 vm1 vm1 439 Oct 17 21:48 employees.csv
drwxrwxrwt 2 root root 4096 Oct 17 17:54 .font-unix/
drwxrwxrwt 2 root root 4096 Oct 17 17:54 .ICE-unix/
drwx----- 2 root root 4096 Oct 17 17:54 snap-private-tmp/
drwx----- 3 root root 4096 Oct 17 18:26 systemd-private-814096b245994b31880faeab4
66490ca-fwupd.service-6RKUvz/
drwx----- 3 root root 4096 Oct 17 17:54 systemd-private-814096b245994b31880faeab4
66490ca-ModemManager.service-2Wgu0m/
drwx----- 3 root root 4096 Oct 17 17:54 systemd-private-814096b245994b31880faeab4
66490ca-polkit.service-581rXc/
drwx----- 3 root root 4096 Oct 17 17:54 systemd-private-814096b245994b31880faeab4
66490ca-systemd-logind.service-AFdjk1/
drwx----- 3 root root 4096 Oct 17 17:54 systemd-private-814096b245994b31880faeab4
66490ca-systemd-resolved.service-7Ib7C7/
```

```
drwx----- 3 root root 4096 Oct 17 17:54 systemd-private-814096b245994b31880faeab4
66490ca-systemd-timesyncd.service-r9UxjM/
drwx----- 3 root root 4096 Oct 17 18:26 systemd-private-814096b245994b31880faeab4
66490ca-upower.service-TdvvTL/
drwx----- 2 root root 4096 Oct 17 17:54 vmware-root_736-2991268455/
drwxrwxrwt 2 root root 4096 Oct 17 17:54 .X11-unix/
drwxrwxrwt 2 root root 4096 Oct 17 17:54 .XIM-unix/
vm1@vm1:/tmp$ cat employees.csv
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ grep "Cairo"employees.csv
^C
vm1@vm1:/tmp$ grep "Cairo" employees.csv
Ahmed,24,Developer,Cairo,45000
Nour,31,Engineer,Cairo,55000
Mona,35,Manager,Cairo,70000
Hassan,26,Developer,Cairo,46000
Mahmoud,33,Manager,Cairo,68000
vm1@vm1:/tmp$ grep "Developer" employees.csv | awk -F',' '{print NR, NF, $0}' empl
oyees.csv
1 5 Ahmed,24,Developer,Cairo,45000
2 5 Fatma,29,Manager,Alexandria,65000
3 5 Omar,22,Intern,Giza,15000
4 5 Nour,31,Engineer,Cairo,55000
5 5 Youssef,27,Developer,Mansoura,48000
6 5 Mona,35,Manager,Cairo,70000
7 5 Karim,23,Designer,Alexandria,35000
8 5 Layla,28,Engineer,Giza,52000
9 5 Hassan,26,Developer,Cairo,46000
10 5 Aya,30,Analyst,Mansoura,41000
11 5 Mahmoud,33,Manager,Cairo,68000
12 5 Salma,25,Designer,Alexandria,38000
13 5 Khaled,29,Engineer,Giza,54000
14 5 Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ grep "Developer" employees.csv | awk -F',' '{print NR, $0}' employee  s.csv
1 Ahmed,24,Developer,Cairo,45000
2 Fatma,29,Manager,Alexandria,65000
3 Omar,22,Intern,Giza,15000
4 Nour,31,Engineer,Cairo,55000
5 Youssef,27,Developer,Mansoura,48000
6 Mona,35,Manager,Cairo,70000
7 Karim,23,Designer,Alexandria,35000
8 Layla,28,Engineer,Giza,52000
```

```
9 Hassan,26,Developer,Cairo,46000
10 Aya,30,Analyst,Mansoura,41000
11 Mahmoud,33,Manager,Cairo,68000
12 Salma,25,Designer,Alexandria,38000
13 Khaled,29,Engineer,Giza,54000
14 Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ grep "Developer" employees.csv | awk -F',' '{print NR, $0}'
1 Ahmed,24,Developer,Cairo,45000
2 Youssef,27,Developer,Mansoura,48000
3 Hassan,26,Developer,Cairo,46000
4 Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ awk '{print $1, $5}' employees.csv
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
vm1@vm1:/tmp$ awk --help
Usage: awk [POSIX or GNU style options] -f progfile [--] file ...
Usage: awk [POSIX or GNU style options] [--] 'program' file ...
POSIX options:           GNU long options: (standard)
  -f progfile          --file=progfile
  -F fs                --field-separator=fs
  -v var=val           --assign=var=val
Short options:           GNU long options: (extensions)
  -b                  --characters-as-bytes
  -c                  --traditional
  -C                  --copyright
  -d[file]            --dump-variables[=file]
  -D[file]            --debug[=file]
  -e 'program-text'  --source='program-text'
  -E file             --exec=file
  -g                  --gen-pot
  -h                  --help
  -i includefile      --include=includefile
  -I                  --trace
  -l library          --load=library
  -L[fatal|invalid|no-ext]  --lint[=fatal|invalid|no-ext]
  -M                  --bignum
  -N                  --use-lc-numeric
  -n                  --non-decimal-data
  -o[file]            --pretty-print[=file]
  -O                  --optimize
  -p[file]            --profile[=file]
  -P                  --posix
  -r                  --re-interval
```

```
-s          --no-optimize
-S          --sandbox
-t          --lint-old
-V          --version
```

To report bugs, use the `gawkbug' program.
For full instructions, see the node `Bugs' in `gawk.info'
which is section `Reporting Problems and Bugs' in the
printed version. This same information may be found at
https://www.gnu.org/software/gawk/manual/html_node/Bugs.html.
PLEASE do NOT try to report bugs by posting in comp.lang.awk,
or by using a web forum such as Stack Overflow.

gawk is a pattern scanning and processing language.
By default it reads standard input and writes standard output.

Examples:

```
awk '{ sum += $1 }; END { print sum }' file
awk -F: '{ print $1 }' /etc/passwd
vm1@vm1:/tmp$ awk -F ',' '{print $1, $5}' employees.csv
Ahmed 45000
Fatma 65000
Omar 15000
Nour 55000
Youssef 48000
Mona 70000
Karim 35000
Layla 52000
Hassan 46000
Aya 41000
Mahmoud 68000
Salma 38000
Khaled 54000
Dina 44000
vm1@vm1:/tmp$ awk -F ',' '{print $1, $5}' employees.csv | sort
Ahmed 45000
Aya 41000
Dina 44000
Fatma 65000
Hassan 46000
Karim 35000
Khaled 54000
Layla 52000
Mahmoud 68000
Mona 70000
Nour 55000
Omar 15000
Salma 38000
Youssef 48000
vm1@vm1:/tmp$ sort --help
Usage: sort [OPTION]... [FILE]...
      or: sort [OPTION]... --files0-from=F
Write sorted concatenation of all FILE(s) to standard output.
```

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

Mandatory arguments to long options are mandatory for short options too.
Ordering options:

-b, --ignore-leading-blanks	ignore leading blanks
-d, --dictionary-order	consider only blanks and alphanumeric characters
-f, --ignore-case	fold lower case to upper case characters
-g, --general-numeric-sort	compare according to general numerical value
-i, --ignore-nonprinting	consider only printable characters
-M, --month-sort	compare (unknown) < 'JAN' < ... < 'DEC'
-h, --human-numeric-sort	compare human readable numbers (e.g., 2K 1G)
-n, --numeric-sort	compare according to string numerical value
-R, --random-sort	shuffle, but group identical keys. See shuf(1)
--random-source=FILE	get random bytes from FILE
-r, --reverse	reverse the result of comparisons
--sort=WORD	sort according to WORD: general-numeric -g, human-numeric -h, month -M, numeric -n, random -R, version -V
-V, --version-sort	natural sort of (version) numbers within text

Other options:

--batch-size=NERGE	merge at most NERGE inputs at once; for more use temp files
-c, --check, --check=diagnose-first	check for sorted input; do not sort
-C, --check=quiet, --check=silent	like -c, but do not report first bad line
--compress-program=PROG	compress temporaries with PROG; decompress them with PROG -d
--debug	annotate the part of the line used to sort, and warn about questionable usage to stderr
--files0-from=F	read input from the files specified by NUL-terminated names in file F; If F is - then read names from standard input
-k, --key=KEYDEF	sort via a key; KEYDEF gives location and type
-m, --merge	merge already sorted files; do not sort
-o, --output=FILE	write result to FILE instead of standard output
-s, --stable	stabilize sort by disabling last-resort comparison
-S, --buffer-size=SIZE	use SIZE for main memory buffer
-t, --field-separator=SEP	use SEP instead of non-blank to blank transition
-T, --temporary-directory=DIR	use DIR for temporaries, not \$TMPDIR or /tmp; multiple options specify multiple directories
--parallel=N	change the number of sorts run concurrently to N
-u, --unique	with -c, check for strict ordering; without -c, output only the first of an equal run
-z, --zero-terminated	line delimiter is NUL, not newline
--help	display this help and exit
--version	output version information and exit

KEYDEF is F[.C][OPTS][,F[.C][OPTS]] for start and stop position, where F is a field number and C a character position in the field; both are origin 1, and the stop position defaults to the line's end. If neither -t nor -b is in effect, characters in a field are counted from the beginning of the preceding whitespace. OPTS is one or more single-letter ordering options [bdfgiMhnRrV], which override global ordering options for that key. If no key is given, use the entire line as the key. Use --debug to diagnose incorrect key usage.

SIZE may be followed by the following multiplicative suffixes:
% 1% of memory, b 1, K 1024 (default), and so on for M, G, T, P, E, Z, Y, R, Q.

*** WARNING ***

The locale specified by the environment affects sort order.
Set LC_ALL=C to get the traditional sort order that uses
native byte values.

GNU coreutils online help: <<https://www.gnu.org/software/coreutils/>>
Full documentation <<https://www.gnu.org/software/coreutils/doc/>>
or available locally via: info '(coreutils) sort invocation'
vm1@vm1:/tmp\$ sort -k\$5 -t',' employees.csv
sort: invalid number at field start: invalid count at start of '-t,'
vm1@vm1:/tmp\$ sort -t -n -k\$5
sort: multi-character tab '-n'
vm1@vm1:/tmp\$ sort -t',' -n -k\$5 employees.csv
sort: invalid number at field start: invalid count at start of 'employees.csv'
vm1@vm1:/tmp\$ awk -F ',' '{print \$1, \$5}' employees.csv | sort -t',' -n -k\$5
sort: option requires an argument -- 'k'
Try 'sort --help' for more information.
vm1@vm1:/tmp\$ awk -F ',' '{print \$1, \$5}' employees.csv | sort -t',' -n
Ahmed 45000
Aya 41000
Dina 44000
Fatma 65000
Hassan 46000
Karim 35000
Khaled 54000
Layla 52000
Mahmoud 68000
Mona 70000
Nour 55000
Omar 15000
Salma 38000
Youssef 48000
vm1@vm1:/tmp\$ awk -F ',' '{print \$1, \$5}' employees.csv | sort -t',' -n -k5
Ahmed 45000
Aya 41000
Dina 44000
Fatma 65000
Hassan 46000
Karim 35000
Khaled 54000
Layla 52000
Mahmoud 68000
Mona 70000
Nour 55000
Omar 15000
Salma 38000
Youssef 48000
vm1@vm1:/tmp\$ awk -F ',' '{print \$1, \$5}' employees.csv | sort -t',' -n -k5,5
Ahmed 45000
Aya 41000
Dina 44000

```
Fatma 65000
Hassan 46000
Karim 35000
Khaled 54000
Layla 52000
Mahmoud 68000
Mona 70000
Nour 55000
Omar 15000
Salma 38000
Youssef 48000
vm1@vm1:/tmp$ sort -t',' -n -k5 employees.csv
Omar,22,Intern,Giza,15000
Karim,23,Designer,Alexandria,35000
Salma,25,Designer,Alexandria,38000
Aya,30,Analyst,Mansoura,41000
Dina,24,Developer,Mansoura,44000
Ahmed,24,Developer,Cairo,45000
Hassan,26,Developer,Cairo,46000
Youssef,27,Developer,Mansoura,48000
Layla,28,Engineer,Giza,52000
Khaled,29,Engineer,Giza,54000
Nour,31,Engineer,Cairo,55000
Fatma,29,Manager,Alexandria,65000
Mahmoud,33,Manager,Cairo,68000
Mona,35,Manager,Cairo,70000
vm1@vm1:/tmp$ sort -t',' -n -k5 -r employees.csv
Mona,35,Manager,Cairo,70000
Mahmoud,33,Manager,Cairo,68000
Fatma,29,Manager,Alexandria,65000
Nour,31,Engineer,Cairo,55000
Khaled,29,Engineer,Giza,54000
Layla,28,Engineer,Giza,52000
Youssef,27,Developer,Mansoura,48000
Hassan,26,Developer,Cairo,46000
Ahmed,24,Developer,Cairo,45000
Dina,24,Developer,Mansoura,44000
Aya,30,Analyst,Mansoura,41000
Salma,25,Designer,Alexandria,38000
Karim,23,Designer,Alexandria,35000
Omar,22,Intern,Giza,15000
vm1@vm1:/tmp$ sort -t',' -n -k5 -r employees.csv > high_earners.txt
vm1@vm1:/tmp$ sort -t',' -n -k5 employees.csv | awk -F ',' '{print $1, $5}' employ ees.csv
Ahmed 45000
Fatma 65000
Omar 15000
Nour 55000
Youssef 48000
Mona 70000
Karim 35000
Layla 52000
Hassan 46000
Aya 41000
Mahmoud 68000
Salma 38000
```

```
Khaled 54000
Dina 44000
vm1@vm1:/tmp$ sort -t',' -n -k5 -r employees.csv | awk -F ',' '{print $1, $5}' employees.csv
Ahmed 45000
Fatma 65000
Omar 15000
Nour 55000
Youssef 48000
Mona 70000
Karim 35000
Layla 52000
Hassan 46000
Aya 41000
Mahmoud 68000
Salma 38000
Khaled 54000
Dina 44000
vm1@vm1:/tmp$ sort -t',' -n -k5 -r employees.csv | awk -F ',' '{print $1, $5}'
Mona 70000
Mahmoud 68000
Fatma 65000
Nour 55000
Khaled 54000
Layla 52000
Youssef 48000
Hassan 46000
Ahmed 45000
Dina 44000
Aya 41000
Salma 38000
Karim 35000
Omar 15000
vm1@vm1:/tmp$ awk -F ',' $2 > 25 > 30
Usage: awk [POSIX or GNU style options] -f progfile [--] file ...
Usage: awk [POSIX or GNU style options] [--] 'program' file ...
POSIX options:           GNU long options: (standard)
    -f progfile          --file=progfile
    -F fs                --field-separator=fs
    -v var=val           --assign=var=val
Short options:           GNU long options: (extensions)
    -b                  --characters-as-bytes
    -c                  --traditional
    -C                  --copyright
    -d[file]            --dump-variables[=file]
    -D[file]            --debug[=file]
    -e 'program-text'   --source='program-text'
    -E file             --exec=file
    -g                  --gen-pot
    -h                  --help
    -i includefile      --include=includefile
    -I                  --trace
    -l library          --load=library
    -L[fatal|invalid|no-ext] --lint[=fatal|invalid|no-ext]
    -M                  --bignum
```

```

-N          --use-lc-numeric
-n          --non-decimal-data
-o[file]   --pretty-print[=file]
-O          --optimize
-p[file]   --profile[=file]
-P          --posix
-r          --re-interval
-s          --no-optimize
-S          --sandbox
-t          --lint-old
-V          --version

```

To report bugs, use the `gawkbug' program.
 For full instructions, see the node `Bugs' in `gawk.info'
 which is section `Reporting Problems and Bugs' in the
 printed version. This same information may be found at
https://www.gnu.org/software/gawk/manual/html_node/Bugs.html.
 PLEASE do NOT try to report bugs by posting in comp.lang.awk,
 or by using a web forum such as Stack Overflow.

gawk is a pattern scanning and processing language.
 By default it reads standard input and writes standard output.

Examples:

```

awk '{ sum += $1 }; END { print sum }' file
awk -F: '{ print $1 }' /etc/passwd
vm1@vm1:/tmp$ awk -F ',' $2 > 25
Usage: awk [POSIX or GNU style options] -f progfile [--] file ...
Usage: awk [POSIX or GNU style options] [--] 'program' file ...
POSIX options:           GNU long options: (standard)
  -f progfile            --file=progfile
  -F fs                  --field-separator=fs
  -v var=val              --assign=var=val
Short options:           GNU long options: (extensions)
  -b                      --characters-as-bytes
  -c                      --traditional
  -C                      --copyright
  -d[file]                --dump-variables[=file]
  -D[file]                --debug[=file]
  -e 'program-text'       --source='program-text'
  -E file                 --exec=file
  -g                      --gen-pot
  -h                      --help
  -i includefile          --include=includefile
  -I                      --trace
  -l library               --load=library
  -L[fatal|invalid|no-ext] --lint[=fatal|invalid|no-ext]
  -M                      --bignum
  -N          --use-lc-numeric
  -n          --non-decimal-data
  -o[file]   --pretty-print[=file]
  -O          --optimize
  -p[file]   --profile[=file]
  -P          --posix
  -r          --re-interval

```

```
-s          --no-optimize
-S          --sandbox
-t          --lint-old
-V          --version
```

To report bugs, use the `gawkbug' program.
For full instructions, see the node `Bugs' in `gawk.info'
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PLEASE do NOT try to report bugs by posting in comp.lang.awk,
or by using a web forum such as Stack Overflow.

gawk is a pattern scanning and processing language.
By default it reads standard input and writes standard output.

Examples:

```
awk '{ sum += $1 }; END { print sum }' file
awk -F: '{ print $1 }' /etc/passwd
vm1@vm1:/tmp$ awk -F ',' '$2 > 25' employees.csv
Fatma,29,Manager,Alexandria,65000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Khaled,29,Engineer,Giza,54000
vm1@vm1:/tmp$ awk -F ',' '$2 > 25 > 30' employees.csv
awk: cmd. line:1: $2 > 25 > 30
awk: cmd. line:1:           ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '$2 > 25 && 30' employees.csv
Fatma,29,Manager,Alexandria,65000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Khaled,29,Engineer,Giza,54000
vm1@vm1:/tmp$ awk -F ',' '$2 > 25 && $2 < 30' employees.csv
Fatma,29,Manager,Alexandria,65000
Youssef,27,Developer,Mansoura,48000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Khaled,29,Engineer,Giza,54000
vm1@vm1:/tmp$ awk -F ',' '$2 >= 25 && $2 <= 30' employees.csv
Fatma,29,Manager,Alexandria,65000
Youssef,27,Developer,Mansoura,48000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Salma,25,Designer,Alexandria,38000
```

```

Khaled,29,Engineer,Giza,54000
vm1@vm1:/tmp$ awk -F',' '{sum += $5} END, sum/NR}' employees.csv
> ^C
vm1@vm1:/tmp$ awk -F',' '{sum += $5} END , sum/NR}' employees.csv
> ;
>
awk: cmd. line:1: +=
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F',' '{sum += $5} END {print "Average Salary:" , sum/NR}' employees.csv
> awk -F ',' '$2 > 25 > 30' employees.csv ^C
vm1@vm1:/tmp$ awk -F ',' '$2 >= 25 && $2 <= 30' employees.csv
Fatma,29,Manager,Alexandria,65000
Youssef,27,Developer,Mansoura,48000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END {print "Average Salary:" , sum/NR}' employees.csv
> ^C
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END {print "Average Salary:" , sum/NR}' employees.csv
awk: cmd. line:1: {sum += $5} END {print "Average Salary:" , sum/NR}
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END {print "Average Salary:" , sum/NR}' employees.csv
awk: cmd. line:1: {sum += $5} END {print "Average Salary:" , sum/NR}
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END , sum/NR}' employees.csv                               awk:
cmd. line:1: {sum += $5} END , sum/NR}
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END , sum/NR}' employees.csv
awk: cmd. line:1: {sum += $5} END , sum/NR}
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END {sum/NR}' employees.csv
vm1@vm1:/tmp$ awk -F ',' '{sum += $2} END {sum/NR}' employees.csv
vm1@vm1:/tmp$ awk -F ',' '{sum += $5} END {print sum/NR}' employees.csv
48285.7
vm1@vm1:/tmp$ awk -F ',' '{count[$4]++} END {for (x in count), print x, count[x]}' employees.csv
awk: cmd. line:1: {count[$4]++} END {for (x in count), print x, count[x]}
awk: cmd. line:1: ^ syntax error
vm1@vm1:/tmp$ awk -F ',' '{count[$4]++} END {for (x in count) print x, count[x]}' employees.csv
Giza 3
Mansoura 3
Cairo 5
Alexandria 3
vm1@vm1:/tmp$ ^C
vm1@vm1:/tmp$
```

```
*** System restart required ***
Last login: Sat Oct 18 12:36:54 2025 from 192.168.1.52
vm1@vm1:~$ cd assignments/
vm1@vm1:~/assignments$ ls
employees.csv
vm1@vm1:~/assignments$ cat employees.csv
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
Amr,32,Analyst,Cairo,43000
vm1@vm1:~/assignments$ sed s/Developer/Software Engineer/g employees.csv >
updated_employees.csv
sed: -e expression #1, char 20: unterminated `s' command
vm1@vm1:~/assignments$ sed 's/Developer/Software Engineer/g' employees.csv >
updated_employees.csv
vm1@vm1:~/assignments$ cat updated_employees.csv
Ahmed,24,Software Engineer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Software Engineer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
Hassan,26,Software Engineer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Software Engineer,Mansoura,44000
Amr,32,Analyst,Cairo,43000
vm1@vm1:~/assignments$ echo "Name, Age, Position, Gouverorate, Salary" | cat -
employees.csv > employees_with_header.csv
vm1@vm1:~/assignments$ cat employees_with_header.csv
Name, Age, Position, Gouvererate, Salary
Ahmed,24,Developer,Cairo,45000
Fatma,29,Manager,Alexandria,65000
Omar,22,Intern,Giza,15000
Nour,31,Engineer,Cairo,55000
Youssef,27,Developer,Mansoura,48000
Mona,35,Manager,Cairo,70000
Karim,23,Designer,Alexandria,35000
Layla,28,Engineer,Giza,52000
```

Hassan,26,Developer,Cairo,46000
Aya,30,Analyst,Mansoura,41000
Mahmoud,33,Manager,Cairo,68000
Salma,25,Designer,Alexandria,38000
Khaled,29,Engineer,Giza,54000
Dina,24,Developer,Mansoura,44000
Amr,32,Analyst,Cairo,43000
vm1@vm1:~/assignments\$