2. Some basic Linux commands work with files and directories

change working directory

cd command, an abbreviation for 'change directory'.

khainguyen@khai: ~/Downloads

```
khainguyen@khai:~$ cd /home/khainguyen/Downloads/
khainguyen@khai:~/Downloads$ pwd
/home/khainguyen/Downloads
khainguyen@khai:~/Downloads$ _
```

Path shortcuts

~   the home directory of the currently logged in 'user_name'

/   the root directory

.   the current directory (or the working directory)

..   the parent directory of the working directory

../.. the parent directory of the parent directory of the working directory

```
khainguyen@khai:~$ cd /
khainguyen@khai:/$ pwd
/
khainguyen@khai:/$ cd /home/khainguyen/Downloads/
khainguyen@khai:~/Downloads$ pwd
/home/khainguyen/Downloads
khainguyen@khai:~/Downloads$ cd ..
khainguyen@khai:~$ pwd
/home/khainguyen
khainguyen@khai:~$ cd /home/khainguyen/Downloads/
khainguyen@khai:~/Downloads$ cd ../..
khainguyen@khai:/home$ pwd
/home
khainguyen@khai:/home$ _
```

```
khainguyen@khai:~$ cd /home/khainguyen/Downloads/
khainguyen@khai:~/Downloads$ pwd
/home/khainguyen/Downloads
khainguyen@khai:~/Downloads$ cd
khainguyen@khai:~$ pwd
/home/khainguyen
khainguyen@khai:~$ _
```

just cd to change to ~

Absolute path: from the root directory to the interest directory/file.

Relative path: from the working directory to the interest directory/file.

Absolute path

Relative path

Clean up all the command lines and results above, with command: clear

or using: Ctrl-L

Listing content (files and subdirectories) of a directory
with command: ls ("ls" stands for "list")

list files and directories in current directory (in short format): `ls`

```
khainguyen@khai: $ ls
2305am     ENTER                               opt                                      r_mgs2amr
bin        Exercise_1                          Pictures                                 shotgun
card       localDB                             Public                                   snap
Desktop    mgs2amr                             qiime2-amplicon-2024.2-py38-linux-conda.yml  Templates
Documents  Miniconda3-py312_24.1.2-0-Linux-x86_64.sh  qiime2-import                     Videos
Downloads  Music                               R
khainguyen@khai: $ _
```

list all files and directories in current directory (in short format): `ls -a` or `ls --all`

```
khainguyen@khai:~$ ls -a
.              .gnome                                    Public
..             .gnupg                                    .python_history
2305am         .hplip                                    qiime2-amplicon-2024.2-py38-linux-conda.yml
.anthy         .ibus                                     qiime2-import
.bash_history  .java                                     R
.bash_logout   .lesshst                                  .Rhistory
.bashrc        .local                                    r_mgs2amr
bin            localDB                                   shotgun
.cache         mgs2amr                                   snap
card           Miniconda3-py312_24.1.2-0-Linux-x86_64.sh  .sudo_as_admin_successful
.conda         .mozilla                                  Templates
.condarc       Music                                     .thunderbird
.config        .ncbi                                     .vim.d
.cups          .nv                                       .var
Desktop        opt                                       Videos
Documents      .pam_environment                          .viminfo
Downloads      Pictures                                  .vscode
ENTER          .pki                                      .wget-hsts
Exercise_1     .profile                                  .xinputrc
khainguyen@khai:~$ _
```

`ls --help` **-a, --all**   do not ignore entries starting with .

list files and directories in current directory (in long format): `ls -l`

```
khainguyen@khai:~$ ls -l
total 140772
drwxrwxr-x  4 khainguyen khainguyen     4096 Thg 3   7 19:26 2305am
drwxrwxr-x  2 khainguyen khainguyen     4096 Thg 10  8  2023 bin
drwxrwxr-x  6 khainguyen khainguyen     4096 Thg 4  21 17:50 card
drwxr-xr-x  2 khainguyen khainguyen     4096 Thg 10  8  2023 Desktop
drwxr-xr-x  2 khainguyen khainguyen     4096 Thg 11 25 22:16 Documents
drwxr-xr-x  4 khainguyen khainguyen     4096 Thg 5   4 00:05 Downloads
drwxrwxr-x 19 khainguyen khainguyen     4096 Thg 3  25 19:50 ENTER
drwxrwxr-x  5 khainguyen khainguyen     4096 Thg 3   6 15:28 Exercise_1
drwxrwxr-x  2 khainguyen khainguyen     4096 Thg 4  21 10:35 localDB
drwxrwxr-x  9 khainguyen khainguyen     4096 Thg 4  18 13:33 mgs2amr
-rw-rw-r--  1 khainguyen khainguyen 144041912 Thg 3  25 17:29 Miniconda3-py312_24.1.2-0-Linux-x86_64.sh
drwxr-xr-x  2 khainguyen khainguyen     4096 Thg 10  8  2023 Music
drwxrwxr-x  3 khainguyen khainguyen     4096 Thg 10  8  2023 opt
drwxr-xr-x  3 khainguyen khainguyen     4096 Thg 10  8  2023 Pictures
drwxr-xr-x  2 khainguyen khainguyen     4096 Thg 10  8  2023 Public
-rw-rw-r--  1 khainguyen khainguyen    13837 Thg 3  25 20:09 qiime2-amplicon-2024.2-py38-linux-conda.yml
drwxrwxr-x 14 khainguyen khainguyen     4096 Thg 3  29 18:11 qiime2-import
drwxrwxr-x  3 khainguyen khainguyen     4096 Thg 4  16 20:03 R
drwxrwxr-x  3 khainguyen khainguyen     4096 Thg 4  18 13:25 r_mgs2amr
drwxrwxr-x  2 khainguyen khainguyen     4096 Thg 5   2 20:11 shotgun
drwx------  7 khainguyen khainguyen     4096 Thg 10 24  2023 snap
drwxr-xr-x  2 khainguyen khainguyen     4096 Thg 10  8  2023 Templates
drwxr-xr-x  3 khainguyen khainguyen     4096 Thg 10 27  2023 Videos
khainguyen@khai:~$ _
```

`ls --help`   `-l`   use a long listing format

list all files and directories in current directory (in long format): `ls -al`

list files and directories in another directory (in long format): `ls -l path_to_directory`

```
khainguyen@khai:~$ ls -l /var/
total 48
drwxr-xr-x  2 root root     4096 Thg 5   1 00:00 backups
drwxr-xr-x 18 root root     4096 Thg 10 11  2023 cache
drwxrwsrwt  2 root whoopsie 4096 Thg 5   5 13:28 crash
drwxr-xr-x 74 root root     4096 Thg 3   6 16:40 lib
drwxrwsr-x  2 root staff    4096 Thg 4  18  2022 local
lrwxrwxrwx  1 root root        9 Thg 10  8  2023 lock -> /run/lock
drwxrwxr-x 14 root syslog   4096 Thg 5   6 00:00 log
drwxrwsr-x  2 root mail     4096 Thg 8   8  2023 mail
drwxrwsrwt  2 root whoopsie 4096 Thg 8   8  2023 metrics
drwxr-xr-x  2 root root     4096 Thg 8   8  2023 opt
lrwxrwxrwx  1 root root        4 Thg 10  8  2023 run -> /run
drwxr-xr-x 16 root root     4096 Thg 10 24  2023 snap
drwxr-xr-x  7 root root     4096 Thg 8   8  2023 spool
drwxrwxrwt 13 root root     4096 Thg 5   6 15:55 tmp
khainguyen@khai:~$ _
```

```
khainguyen@khai:~$ ls -l
total 140772
drwxrwxr-x   4 khainguyen khainguyen      4096 Thg 3    7 19:26 2305am
drwxrwxr-x   2 khainguyen khainguyen      4096 Thg 10   8  2023 bin
drwxrwxr-x   6 khainguyen khainguyen      4096 Thg 4   21 17:50 card
drwxr-xr-x   2 khainguyen khainguyen      4096 Thg 10   8  2023 Desktop
drwxr-xr-x   2 khainguyen khainguyen      4096 Thg 11  25 22:16 Documents
drwxr-xr-x   4 khainguyen khainguyen      4096 Thg 5    4 00:05 Downloads
drwxrwxr-x  19 khainguyen khainguyen      4096 Thg 3   25 19:50 ENTER
drwxrwxr-x   5 khainguyen khainguyen      4096 Thg 3    6 15:28 Exercise_1
drwxrwxr-x   2 khainguyen khainguyen      4096 Thg 4   21 10:35 localDB
drwxrwxr-x   9 khainguyen khainguyen      4096 Thg 4   18 13:33 mgs2amr
-rw-rw-r--   1 khainguyen khainguyen 144041912 Thg 3   25 17:29 Miniconda3-py312_24.1.2-0-Linux-x86_64.sh
drwxr-xr-x   2 khainguyen khainguyen      4096 Thg 10   8  2023 Music
drwxrwxr-x   3 khainguyen khainguyen      4096 Thg 10   8  2023 opt
drwxr-xr-x   3 khainguyen khainguyen      4096 Thg 10   8  2023 Pictures
drwxr-xr-x   2 khainguyen khainguyen      4096 Thg 10   8  2023 Public
-rw-rw-r--   1 khainguyen khainguyen     13837 Thg 3   25 20:09 qiime2-amplicon-2024.2-py38-linux-conda.yml
drwxrwxr-x  14 khainguyen khainguyen      4096 Thg 3   29 18:11 qiime2-import
drwxrwxr-x   3 khainguyen khainguyen      4096 Thg 4   16 20:03 R
drwxrwxr-x   3 khainguyen khainguyen      4096 Thg 4   18 13:25 r_mgs2amr
drwxrwxr-x   2 khainguyen khainguyen      4096 Thg 5    2 20:11 shotgun
drwx------   7 khainguyen khainguyen      4096 Thg 10  24  2023 snap
drwxr-xr-x   2 khainguyen khainguyen      4096 Thg 10   8  2023 Templates
drwxr-xr-x   3 khainguyen khainguyen      4096 Thg 10  27  2023 Videos
```

File type:
"d" means
this is a
directory

Permissions

number of
hard links

Owner of file
(user_name)

user
group

size
(in bytes)

Last modification time

directory/file name

Create and remove directory

Create a directory named "Huka" in the current directory (~) , with the command: mkdir

mkdir Huka	or	mkdir ./Huka

"mkdir" stands for "make directory"

Run "ls" to check   a new directory is created

Create and remove directory

Create three directory named "Huki", "Huka", "Huke" in the current directory

```
mkdir Huki Huka Huke
```

Delete a empty directory named "Huka" in current directory, with command: rmdir

```
rmdir Huka
```
"rmdir" stands for "remove directory"

Delete a non-empty directory named "Huka" in current directory, with the command "rm", option -r:

```
rm -r Huka
```
or
```
rm -R Huka
```
or
```
rm --recursive Huka/
```
"rm" stands for "remove"

```
rm --help
```

```
-r, -R, --recursive   remove directories and their contents recursively
```
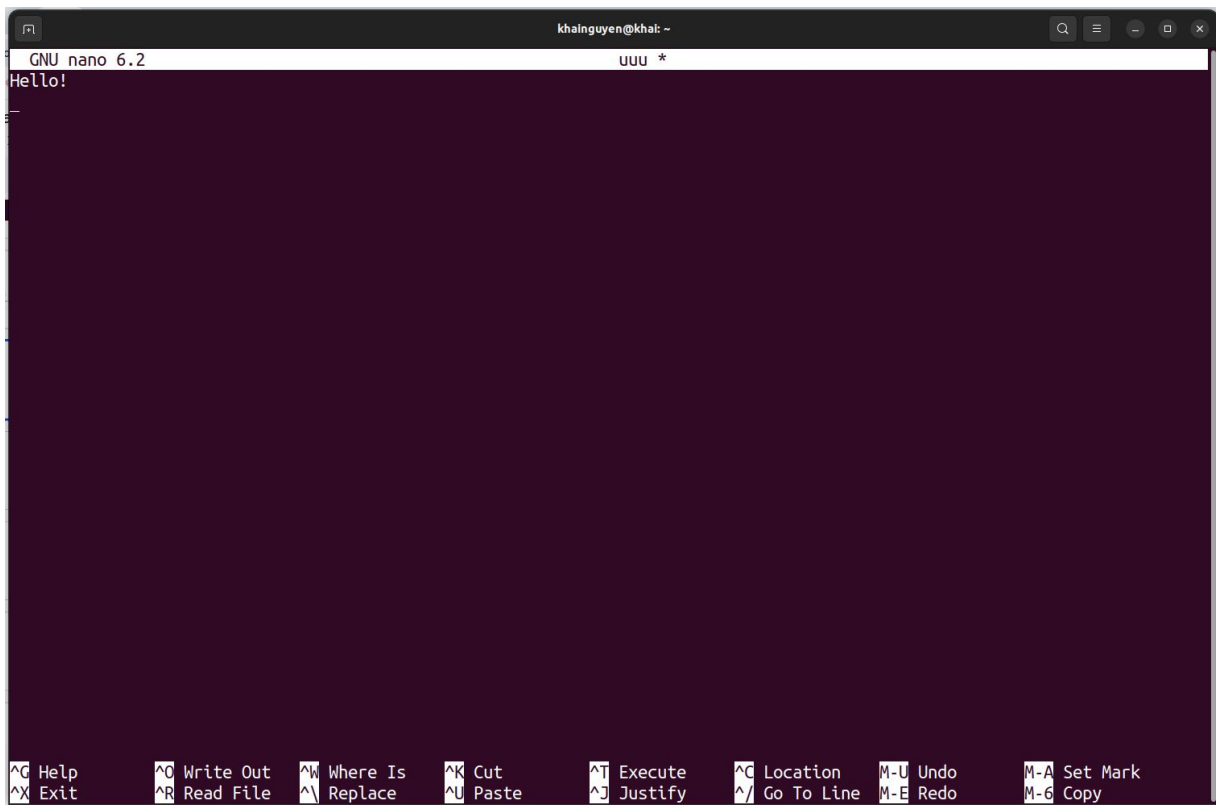
Create and remove file

Create and edit text file with nano, a text editor

1. Create a text file named "uuu" ("uuu" doesn't exist): | nano | or | nano uuu |

2. Exit nano: ctrl + x

3. Type "y" to save:

```
GNU nano 6.2                 uuu  *
Hello!




Save modified buffer?
Y Yes
N No                    ^C Cancel
```
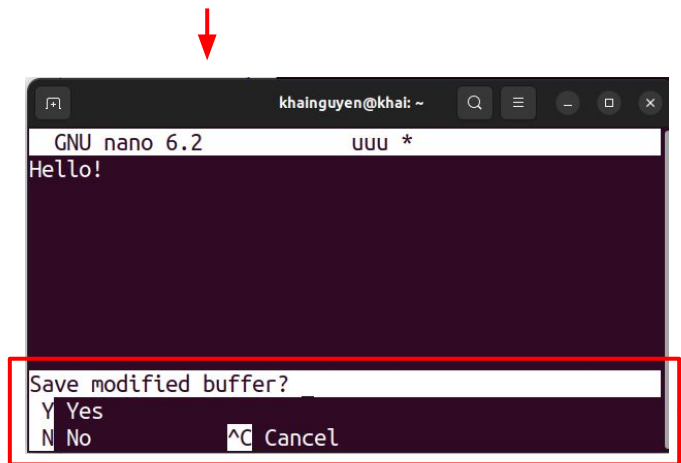
```
GNU nano 6.2                 uuu  *
Hello!




File Name to Write: uuu
^G Help      M-D DOS Format   M-A Append     M-B Backup File
^C Cancel    M-M Mac Format   M-P Prepend    ^T Browse
```
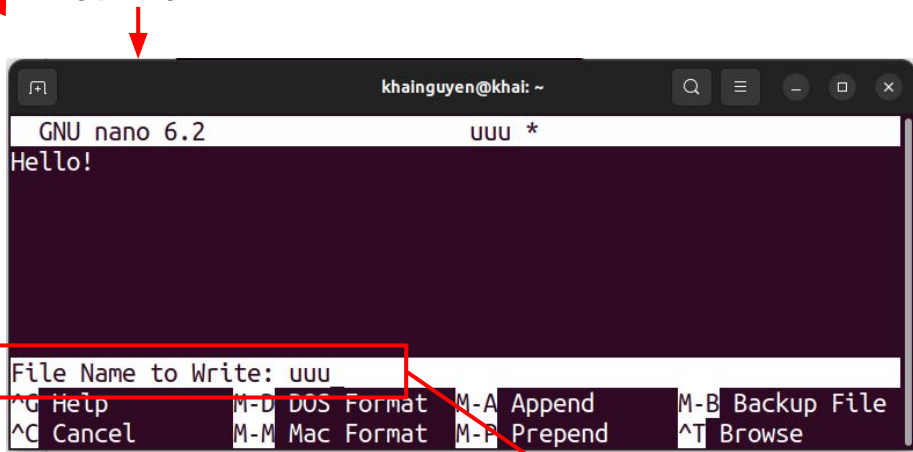
Edit the file name if you don't want the name "uuu"

4. Finish: press ENTER key

We can view the file "uuu" with nano by run (if the file exist in current directory):

nano uuu

Create a empty file named "uuu", with "touch" command : touch uuu

Delete a (empty or non-empty) file named "uuu" in current directory, with the command "rm":

rm uuu

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View the file with another commands

View the file with command: less

```
khainguyen@khai:~$ less uuu
```

ENTER

```
dgdfg
gdgdf
dfgdfgd
uuu (END)
```

press "q" key to quit

View the file with command: cat

```
khainguyen@khai:~$ cat uuu
dgdfg
gdgdf
dfgdfgd
```

Copy and move file/directory

Copy a file named "uuu" in the current directory to ./Download/, with command: cp

cp ./uuu ./Download/   "cp" stands for "copy"

Copy three the file named "uuu", "iii", "yyy" in the current directory to./Download/

cp ./uuu ./iii ./yyy ./Download/   or   cp uuu iii yyy ./Download/   or   cp ./{iii,yyy,uuu} ./Downloads/

Create a copy of the file named "uuu" with a different name "ooo" in the current directory

cp ./uuu ./ooo

Copy a empty directory named "Huka" in the current directory to ./Download/

cp ./Huka/ ./Download/

note again: **./** means the current directory

Copy and move file/directory

Copy a non-empty directory named "Huka" in the current directory to ./Download/

```
cp -r ./Huka/ ./Download/
```

Move a file named "uuu" in the current directory to /home/khainguyen/Download/, with command: mv

```
mv ./uuu ./Download/
```
"mv" stands for "move"

Move a empty directory named "Huka" in the current directory to /home/khainguyen/Download/

```
mv ./Huka/ ./Downloads/
```

if Huka/ is a non-empty directory, add -r option:
```
mv -r ./Huka/ ./Downloads/
```

Rename a file named "uuu" to "eee":

```
mv ./uuu ./eee
```

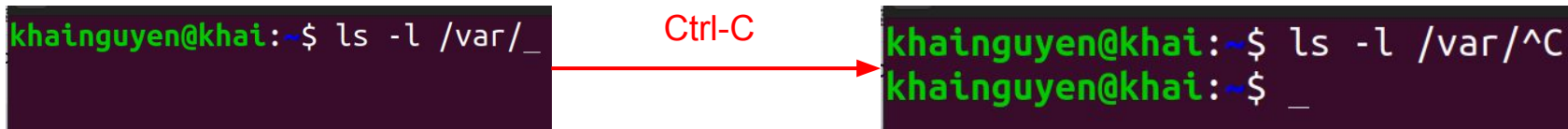Rename a directory named "Huka" to "Huko":

```
mv ./Huka/ ./Huko/
```

Shortcuts:

· Ctrl-C   stops the current in-progress command and/or

```
khainguyen@khai:~$ ls -l /var/_
```
Ctrl-C →
```
khainguyen@khai:~$ ls -l /var/^C
khainguyen@khai:~$ _
```

· **Up arrow** key: shows previous commands

```
khainguyen@khai:~$ _
```

· history command: will show the history of commands you have run.

Shortcuts:

· Ctrl-A   moves the cursor to the beginning of the line.

· Ctrl-E   moves the cursor to the end of the line.

· Tab key   automatically completes commands.

have the same "Do"

press **tab** a second time

type "c"

press **tab**
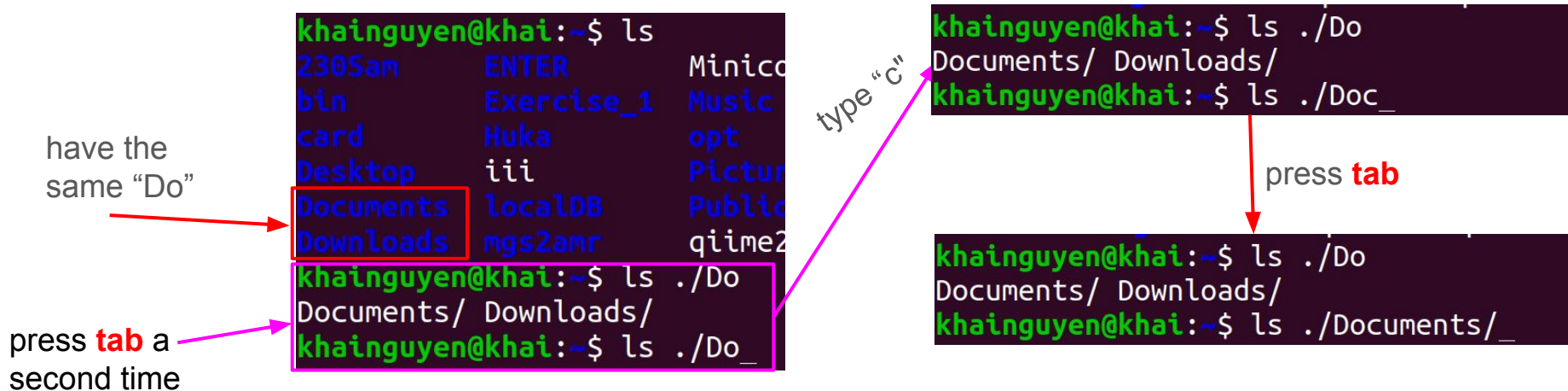
· Ctrl-D   exit the terminal.

Summary

pwd	print working directory (or current directory) path
cd	change working directory
ls	Listing content (files and subdirectories) of the directory
clear	clean up all the command lines and results above
mkdir	create the directory
rmdir	delete the empty directory
rm	delete file
rm -r	delete non-empty (or empty) directory, delete file

Summary

nano	a text editor: create, view, edit the text file
touch	create the empty file
less	view text file page by page
cat	Print the content of the text file to the terminal
cp	copy file/directory
mv	move file/directory, rename file/directory
man command_name	Instructions for using the command
command_name --help	

Homework

1. Move to the "Documents" directory in "user_name" directory in home directory. Use: cd

Solve the questions below while still in the "Documents" directory

2. Create 01 directory named "bio1" in "Documents" directory. Use: mkdir

3. Create 01 file named "chr1" in "bio1" directory. Use: touch or nano

4. Create 02 directories named "bio2" and "bio3" in "Documents" directory, with **one command line**. Use: mkdir

5. Create: 2 files named "chr2" and "chr3" in "bio2" directory, 2 files named "chr4" and "chr5" in "bio3" directory, with **one command line**. Use: mkdir

6. Copy "chr2" file into "bio1" directory, with a different name "c2". Use: cp

7. Delete all newly created files and folders above, with **one command line**. Use: rm -r