

Network Administration/System Administration (NTU CSIE, Spring 2024) Homework #2

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Code Explanation

I finished all 5 subtasks of this project. Below are descriptions of every function throughout the script.

- **err**: Print debug messages to STDERR.
- **usage**: Print usage message and exit.
- **parse_args**: Parse arguments and save them into corresponding global variables. If unknown options are met, call **usage** immediately. Call **verify_args** after parsing to verify them.
- **check_exist**: Check if the given file exists. If the file is a symbolic link and **-l** is not on, its regarded non-existent.
- **verify_args**: Verify parsed arguments. This includes checking:
 - **-r** should be on if **-a** or **-n** is on.
 - There should be exactly 2 positional arguments.
 - Both **<PATH A>** and **<PATH B>** exists.
 - **<PATH A>** and **<PATH B>** should be both directories if **-r** is on, and both should not be directories otherwise.
- **max**: Return the greater of two integers.
- **compare_files**: Compare two regular files. Outputs nothing if files are identical, **changed X%** if files differ, where **X** is calculated according to the problem specification. Tools **grep**, **tail**, and **awk** are used to process the output of **diff** and calculate the number of lines deleted and inserted.
- **compare_symlinks**: Compare paths pointed by two symbolic links. Outputs nothing if symbolic links point to the same path, **changed 100%** if they point to different paths. We compare the outputs of **readlink**.
- **compare_files_or_symlinks**: Compare two files or symbolic links. Dispatch comparison to **compare_files** or **compare_symlinks** based on type. Outputs **changed 100%** if comparing one regular file and one symbolic link.

- **compare_directories**: Recursively compare two directories. Performs regex filtering if `-n <EXP>` is given.
- **main**: Entry point of the script.

References

Listed below are all references that I've consulted for each subtask.

1 參數檢查

- [Bourne Shell Builtins \(Bash Reference Manual\)](#)
- [shell - An example of how to use getopts in bash - Stack Overflow](#)
- [Conditional Constructs \(Bash Reference Manual\)](#)
- [Bash Conditional Expressions \(Bash Reference Manual\)](#)
- [Shell Parameter Expansion \(Bash Reference Manual\)](#)

2 比較檔案

- [linux - Understanding of diff output - Unix & Linux Stack Exchange](#)
- [Arithmetic Expansion \(Bash Reference Manual\)](#)
- [ShellCheck: SC2207 -Prefer 'mapfile' or 'read -a' to split command output \(or quote to avoid splitting\).](#)
- [Shell Arithmetic \(Bash Reference Manual\)](#)
- [Detailed Unified \(Comparing and Merging Files\)](#)
- [How to use awk to count the total number of input lines in a file? - Unix & Linux Stack Exchange](#)
- `man grep`, `man diff`, `man wc`, and `man awk`
- Discussions on NTU COOL about cases where there's no newline at end of file.

3 比較目錄

- [Shell Parameter Expansion \(Bash Reference Manual\)](#)
- [How to sort an array in Bash - Stack Overflow](#)
- `man uniq`, `man sort`, and `man locale.7`
- Discussions on NTU COOL about cases where `<PATH A>` or `<PATH B>` is hidden.

4 隱藏的檔案與 Symlink

- [command line - How should I glob for all hidden files? - Ask Ubuntu](#)
- [The Shopt Builtin \(Bash Reference Manual\)](#)
- [Bash Conditional Expressions \(Bash Reference Manual\)](#)
- `man readlink`
- Discussions on NTU COOL about the correct behavior of ignoring symbolic links if `-l` is not given.
- Discussions on NTU COOL about the sorting result when running the script on workstations.

5 僅比較特定的檔案

- [Regular Expressions/POSIX-Extended Regular Expressions - Wikibooks, open books for an open world](#)
- [Conditional Constructs \(Bash Reference Manual\)](#)
- Discussions on NTU COOL about how to treat option-like regular expressions.