

Adv. Unix/Linux Sys. Prog. Homework 1 (March 2025)

1. Write your own version of `tree` using system calls taught in the previous lectures. Add ANSI colors¹ to identify the type of the file, i.e., color normal files, directories, executables, pipes, block devices, character devices, and soft links.

- (a) Add file size to the end of the file.

```
/.
+-- bin (1181 files) -> usr/bin
+-- bin.usr-is-merged (1 file)
+-- boot (15 files)
|   +-- config-6.8.0-52-generic (67155054)
|   +-- config-6.8.0-55-generic (68685955)
```

- (b) Accept input parameters, i.e., `mytree -h <directory>` to change the file size to human readable short format. If file size is greater than 1Kb, 1Mb, 1GB, or 1TB, print the corresponding size rounded to 2 decimal digits. If the file is a directory, print the number of files in that directory.

```
/.
+-- bin (1181 files) -> usr/bin
+-- bin.usr-is-merged (1 file)
+-- boot (15 files)
|   +-- config-6.8.0-52-generic (64.04M)
|   +-- config-6.8.0-55-generic (65.50M)
...
```

- (c) Add permissions to the end of the file and directory, i.e., `mytree -p <directory>`. If the parameters `-h` and `-p` are used together, the print the permission first then the size of the file.

```
/.
+-- bin -> usr/bin (rwxrwxrwx)
+-- bin.usr-is-merged (rwxr-xr-x)
+-- boot (rwxr_xr_x)
|   +-- config-6.8.0-52-generic (rw-r--r--)
|   +-- config-6.8.0-55-generic (rw-r--r--)
```

- (d) If possible, add a “→” symbol to represent de-referenced files (from soft links).

¹https://en.wikipedia.org/wiki/ANSI_escape_code

```
/root  
+-- client -> /home/ems/ems-client-master  
+-- install.sh
```

- (e) Sort the file names result in alphabetical order when user uses `-a` parameter or reversed alphabetical order when user uses `-r` parameter, i.e., `mytree -h -r <directory>` or `mytree -hr <directory>`
- (f) Support the input of multiple directories, i.e., `mytree -h <directory1> <directory2> <directory3> ...`